

Bob Cooper's

SEPTEMBER 15 1995

SatFACTS

MONTHLY



Reporting on "The World" of satellite television in the Pacific Ocean Region

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Programmers
Headed Your Way!

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SatFACTS Monthly is published 12 times each year (on or about 15th of each month) by Far North Cablevision, Ltd. This publication is dedicated to the premise that as we enter the 21st century, ancient 20th century notions concerning borders and boundaries no longer define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of the messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

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COOP'S COMMENT

In a suburban neighbourhood of Jakarta a bicycle repair shop now sprouts four satellite dishes on the roof. A fifth adorns an open doorway. Inside, the proprietor is doing a brisk business selling DIY (do it yourself) home satellite systems. He laughs a lot while telling his tale.

"One year ago," he begins, "I fix bicycles. My family OK but we not wealthy. Now," as he points proudly at a colour photo on his shop counter, "We have car and three TVs!"

Indonesia's Palapa series of satellites has done for people like this shop owner precisely what the government intended; it has provided them with an opportunity to improve their status in life, build a business, and actually begin their own personal trek to the wonderful world of 'Middle Class' status. The shop keeper plans to move into a newer building in 1996 with glass front windows and, he proudly tells me, "A real street address." A proper number for his building, and an address which he can advertise in hopes that customers will be able to find him.



per capita family income.

"Sharing," is the answer. "Many families go together to buy a dish system and run wires (read coaxial cable - we hope!) to many homes." How well does it work, we query. "Usually OK," is the response, "But big problem is deciding which channel to watch." When you have one receiver and one decoder and five premium services to select from (plus 15 that are FTA) this would be a problem; especially with six families sharing the same system. "Now people come back to buy more receivers," our shop keeper adds. "Usually they first buy extra receiver for free channels for each home; then come back later to buy extra decoders."

Today, the Palapa (B2P) programming packages are limited to Indonesia and nearby south-eastern Asia countries. In January, a new Palapa with a far greater reach will be launched and by late February bicycle repair shops from Dunedin to Melbourne, Pago Pago to Noumea will be tempted to give up inner tube repairs to join our shop keeper in Jakarta. Wherever new satellites appear new business opportunities beckon; see page 6 in this issue.



September 15, 1995

The hottest selling satellite services? "Indovision," he smiles. "People like Cartoons and HBO." Indovision requires a B-MAC decoder (selling for around US\$500) and a year's subscription for 5 channels typically sold in advance (US\$480). We ask how this cost added to the cost of a dish, LNB and wiring, is affordable in a country where the sum of these items exceeds the average annual

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TECHNOLOGY: Basics of Narrowband Service (page 10)
REBUILDING MATV for satellites / part 6 (page 16)

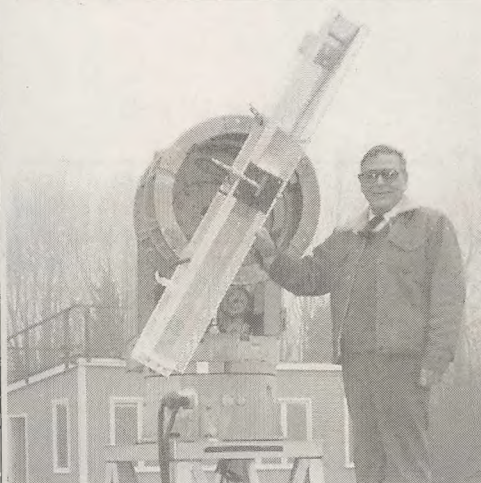
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-ON THE COVER-

When cost and assembly time are not a factor, solid metal surface dishes continue to be the design of choice. But mesh surface dishes have constantly improved in performance and they certainly are easier to install! Here, Phil Keith puts the finishing touches on a 3.7m.

MEET GLYN BOSTICK



Glyn Bostick with working partner Emily Bostick founded Microwave Filter Company in 1967; a high tech house that created most of the new innovation filters, signal traps and signal conditioning devices that ultimately found widespread use in the cable TV and MMDS industries of North America. In 1992, the duo dynamic formed Communications & Energy Corporation to develop still additional innovative cable and MMDS products.

Their new book "The Wireless Primer" is everyman's guide book to planning wireless cable (MMDS) systems.

Glyn will be on hand at SPRSCS Friday January 26th to help you better understand the "Cable vs. MMDS" technical puzzle. Don't miss him! (No, he won't be flying in from Syracuse, New York using the gadget in the photo above!

SPACE Pacific's
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PROGRAMMER PROGRAMMING PROMOTION

UPDATE

SEPTEMBER 15, 1995

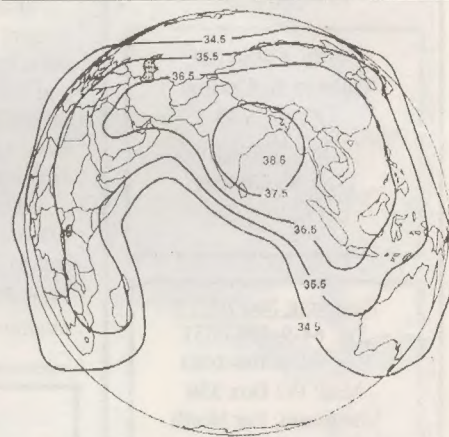
Bad News / Good News Two major PAS-2 programmers have apparently decided they will not provide DTH (direct to home) service after all via PanAmSat satellite. Turner Network Television (+ Cartoon) and Music Television (MTV) are now both telling would-be DTH subscribers that offering DTH service at this time, while they are using (interim analogue) B-MAC encryption, would be a "legal problem." Their concern is that while a cable firm may part with US\$1,300 for a SA B-MAC IRD and write it off in 12 to 24 months when both services switch to MPEG, consumers will not be so tolerant of being stuck with yesterday's IRD. To avoid this situation, both now say they will deal with CATV and SMATV only but suggest 100 homes or more should be minimum likely subscription base if you wish to be considered for commercial contract service. The good news??? Both MTV and TNT are available within the Palapa DTH programme package now on Palapa B2P and soon in the air in your neighbourhood from C1 (February-March); see feature report on p. 6 this issue.



No DTH for PAS-2 TNT

More Bad News. Optus B3 bird, put into operation as SF#12 was being posted, may be doing everything Optus hoped but of the test signals seen to date, it is a disappointment. Detailed report on page 24 this issue.

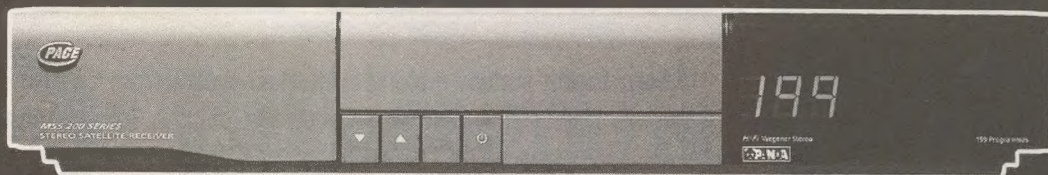
Unexpected good news for much of Australia, Africa, Asia; Thaicom 3 global C band coverage from 78.5E will exceed 34.5 dBw. Scheduled for late 1996 launch, TC3 will bridge world from middle Europe and all of Africa to Australia and Japan (footprint courtesy Mark Long to appear in World of Satellite TV book to be released at SPRSCS in January).



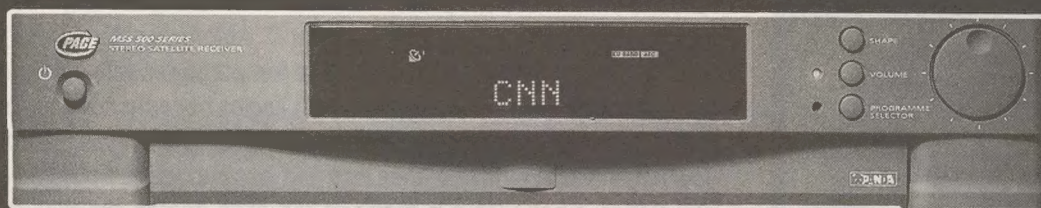
Caution. Excitement you may feel after reading report on January launch of Palapa C1 (p. 6, here) should be tempered by 113E Clarke Orbit location. Australians within hot footprint have it made; good (elevated) look angles, strong signals. New Zealanders will find C1 better than AsiaSat 2 but still "low" towards horizon. How low? Kaitia 15.64, Auckland 14.13, Hastings 11.64, Wellington 12.58, Christchurch 13.27, Greymouth 14.59 and Dunedin 13.80. Elsewhere in Pacific many will have to hand-pick dish locations to miss low angle blockage from hills, trees, buildings: American Samoa 5 degrees, Chatham 2 degrees (!), Fiji 15, Gilberts 22, Marshalls 27, Nauru 27, New Caledonia 26, Niue 4, Norfolk 22, Tonga 8, Wallis & Futuna 8 and Western Samoa 6. Tahiti, Cooks out of luck; Others not listed are safely above 25.

TNT use of second half of TR15 (PAS-2)? Digital customised versions of TNT + Cartoons one possibility; separate feeds for English speaking Pacific, Thailand, Taiwan and Japan and India.

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UPDATE

SEPTEMBER 15, 1995

Micro-mesh surface material is latest innovation from Orbitron with distributor claiming increases in antenna gain of up to 2dB at Ku and up to 1 dB at C over previous dish surfacing material. While certainly dish surface reflectivity and accuracy is major design concern, there are other problems with dual-band dishes still to be sorted. Leading list would be degraded performance on both C and Ku bands when using dual-band feed antenna. As many are learning from trial and error, a dish that produces P4 or even P3 pictures on C will usually snap to P5 signals when you substitute a single band feed for the C + Ku versions available. So how do you get optimised performance on both C and Ku with a single feed antenna device? For now, an unsolved riddle and a difficult decision for installers. If you must have optimised performance on both bands, this really says two dishes and two feeds.

Canadian - Japanese LNB source Norsat is advertising 15 degree C-band unit. There are practical limits in determining not only "How low can you go" but also in "Is lower really better?" Antenna system performance is combination of antenna plus LNB noise temperatures with antenna noise temp increasing as dish look (elevation) angles become smaller. As the dish noise temp becomes worse ("higher") for lower look angles, improvement in low noise temp LNBs becomes less and less important. For most consumer 3m dishes, a noise temp in region of 35K at 45 degree elevation angle is pretty standard. But at 10 degree elevation, same antenna noise temp could easily become 70K. Should you be able to see improvement of 15 degree LNB over a 30 degree LNB with an antenna noise temp of 70K? Unlikely.

IFA Berlin, billed as "The World's Largest Electronics Show," has just wrapped up and Germany's Tele-Satellit publisher Alexander Wiese reports:

"It takes two full days to walk, once, through the exhibit halls. Overpowering by the impact was the European 16:9 widescreen TV displays, although largely from European (not Asian) manufacturers. Sharp did display an LCD projector set that is optically enlarged to a 16:9 (widescreen) image. Good effort, cooler colours than with the direct view CRT sets. Another Sharp innovation - real 3D TV images without glasses. They do this by gluing a small spot in the centre of your forehead and at the TV screen a camera 'follows the spot' to determine where your eyes are at any instant. This in turn tells the computer how to mis-align twin images on the screen so that after parallax your mind believes it is seeing depth in addition to width and height. Will tomorrow's children all be born with a spot on their forehead between their eyes? Will we all look like today's Hindi women? Future channel surfers may have a device from Polytron to assist. At the cable or SMATV headend a special package processes as many as 20 separate channels and then remixes them so that on a normal screen you have 20 tiny screens all showing a different picture. With your remote select the one you want and ZAP there it is on the screen all by itself. Another interesting innovation - a (Ku band) satellite antenna the size of a candy bar. The system uses Fresnel Lens technology but the creators believe it is today too expensive to compete with 60cm quasi parabolic dishes selling throughout Europe for as little as NZ/\$25. The technology for this one originated in a (formerly Eastern) German laboratory."

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PALAPA C1 COULD SOLVE PACIFIC PROBLEMS

The Gang Of Five

The battle for control of Asian telecasting will advance a notch in February with the scheduled launch of Palapa C1 satellite to 113E. This satellite replaces Palapa B2P, launched March 20, 1987 which had an expected in orbit lifetime of 8 years and 2 months. B2P's station keeping fuel supply has been scraping the bottom of the container since May and some industry sources report B2P will enter figure 8 inclined orbit operation not later than this November. C1 had originally been scheduled for November 1995 launch using Ariane; in June (SF#10, p.21) a change to Lockheed Martin Atlas IIAS from Cape Kennedy was announced for January (1996). Further, C2(M) which was previously scheduled for launch in November 1996 will now also be lifted into orbit by Lockheed but at the advanced schedule of April (1996).

The battle for minds, through television programming, began when ESPN Asia, Discovery Asia and HBO Asia (three major US programmers) elected to lease space on B2P in 1992. At the time they said they would move to ApStar 2 when it became available in 1994-95. The loss of AP2 in January during launch left these programmers with an uncertain future.

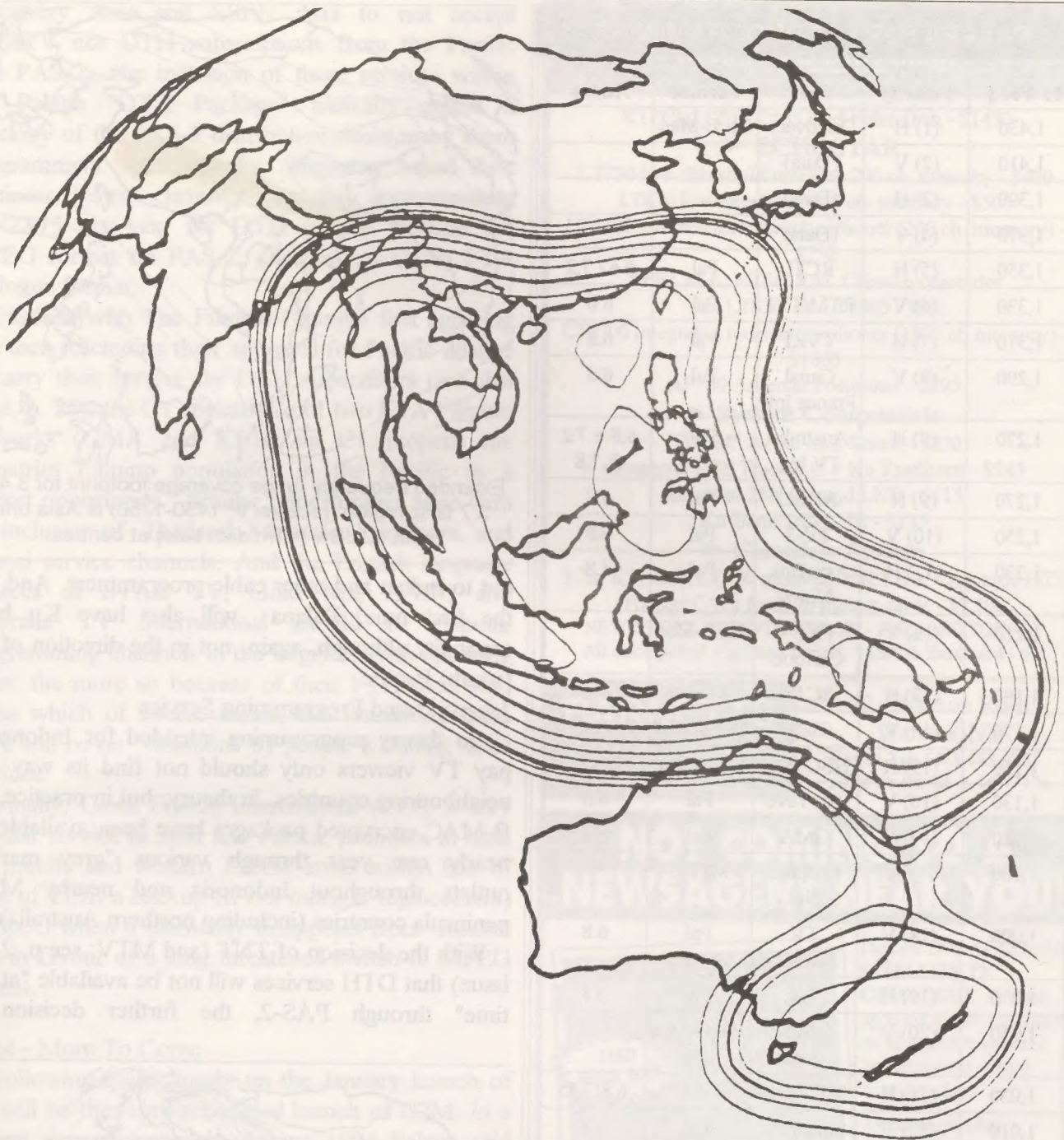
In the interim an aggressive cable and DTH marketing service calling itself Indovision has gained strength from headquarters in Jakarta (Indonesia) and it now offers this trio of English language services plus the additional programming of CNNI and TNT + Cartoons. B2P has thus become, quite by accident, the DTH satellite of Asia as in addition to the five B-MAC encrypted American origin service channels we also have free to air (FTA) English service from Australian Television International (ATVI), ANBC, Asia Business News, (Australia's Channel 9) Gold Network and a mixture of programming from a preview channel operated by STAR TV. Add to this Canal France International (CFI) and 11 ethnic channels from Indonesia, the Philippines, Singapore and Malaysia and the sum is

an awesome array of programming available to anyone with a dish in the under 3m range.

The most significant factor relating to the replacement of B2P with C1 is that the new satellite has predicted footprint coverage inside of their 3m dish contours that includes all of New Zealand and most of the more heavily populated eastern regions of Australia (with Tasmania). Bottom line? When C1 goes on line, all of those services transferring from B2P to C1 will suddenly become first-time available on dishes as small as 2m in a region of the Pacific which to date has been largely forgotten by the dedicated to DTH and SMATV cable programmers.

What this says to satellite dish users and system installers from Brisbane to Hobart, throughout New Zealand, as well as across all of northern Australia and PNG is that small dish systems with 20-plus programming services will become instantly feasible. Furthermore, while marketing plans for the encrypted services (HBO, ESPN, Discovery, CNNI and TNT + Cartoons) have not been announced, the model for the existing B2P distribution in northern Australia (which B2P now reaches) is likely to find its way into the new coverage areas as well. SF will look at this aspect of encrypted programming in a future issue but suffice to note that for US\$980 a DTH system can be equipped with a B-MAC (SA model CDE-2000) decoder plus a year's worth of service from the five programmers participating in this marketing plan. The US\$980 breaks down as US\$500 for the CDE-2000 decoder and US\$480 for a year's subscription to the five programming channels with annual renewals pegged at US\$480. All of this seems pretty attractive to a Pacific area DTH dealer now attempting to sell services such as CMT when the receivers alone cost US\$1,445 at the distributor level or The Filipino Channel with receivers costing US\$2,550 to the dealer!

When C1 is launched (mid-January scheduled) it will begin a two week positioning trip and commence check out. By mid to late February, with testing complete, the hand over will begin and end all probably within a few hour period. Transponders on B2P will be turned off while the same transponders on C1 are turned on and for viewers in the Pacific



Palapa C1 footprint contours; each contour line is 1dB offset from those following it. Contour covering virtually all of New Zealand plus SE Australia coastal region is 35 dBw or suitable for dishes as small as 1.7m (5.6')!

region the signals will jump out of the noise one at a time until the switch over is completed

The programming mix offers something for a wide variety of viewing interests (see present B2P transponder list on page 8, here). There are five Indonesian national services (An-Teve, RCTI, SCTV - Surya Citra Televisi, TV Indosair, and, TPI - Televisi Pendidikan Indonesia), two Malaysian services (TV Malaysia, TV3), a Thailand service (TV 11), two Philippines services (GMA and KBB People's Network), a French service (Canal France International), a Mandarin service (Singapore International Television), Radio TV Brunei, and four

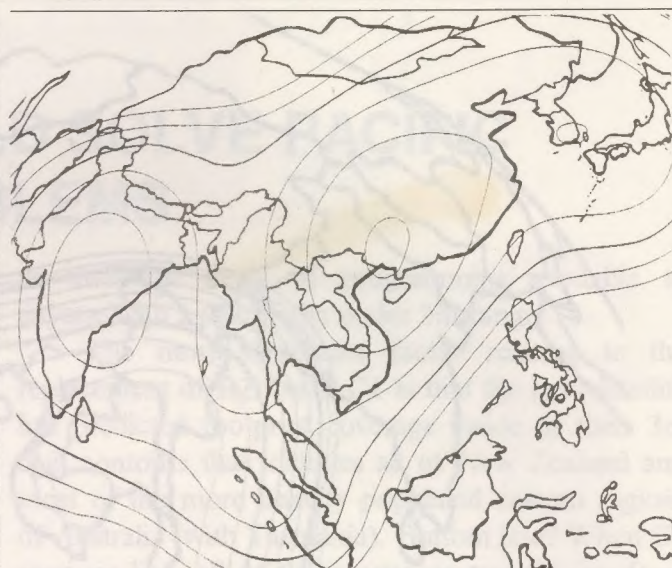
English language services all presently 'FTA' (Asia Business News, Australian Television International, STAR TV, and The Gold Network). A number of new services are also waiting to be added to the list as additional (some digital) transponder space becomes available.

Also on board C1 will be an "expanded C band" frequency band (3,400 to 3,700 MHz) which has a special footprint of only passing interest to most in the Pacific (see contour map, page 8). This Asian beam service has room for a minimum of 10 transponders and most of these are likely to be leased

PALAPA B2P / C1 PROGRAMMERS

IF Freq.	Polarity	User	Format	Audio
1,430	(1) H	Discovery	Pal B-Mac	
1,410	(2) V	(Data)		
1,390	(3) H	(Data)		
1,370	(4) V	(Data)		
1,350	(5) H	RCTI	Pal	6.6/ 7.2
1,330	(6) V	RTM/TV1	Pal	6.6
1,310	(7) H	TVRI	Pal	6.8
1,290	(8) V	Canal France Int.	Pal	6.6
1,270	(9) H	Australia TV Int.	Pal	6.8 + 7.2 & 7.8
1,270	(9) H	ANBC	Pal	6.8
1,250	(10) V	TV-3	Pal	6.8
1,230	(11) H	Asia Bus. News	Pal	6.8
1,210	(12) V	TNT + Cartoon	Pal B-Mac	
1,190	(13) H	SCTV	Pal	6.6
1,170	(14) V	CNNI	Pal B-Mac	
1,150	(15) H	HBO Asia	Pal B-Mac	
1,130	(16) V	An-Teve	Pal	6.8
1,120	(17) H	GMA	Pal	6.8
1,100	(17+) H	People's Net	MPEG	
1,090	(18) V	TV Indostar	Pal	6.8
1,070	(19) H	TPI	Pal	6.8
1,050	(20) V	ESPN Asia	Pal B-Mac	
1,030	(21) H	MTV Asia	Pal	6.8/7.55
1,010	(22) V	Singapore TV Int.(1)	Pal	6.8
1,010	(22) V	Radio TV Brunei(2)	Pal	6.8
1,010	(22) V	Gold Net / 9 Aust.(3)	Pal	6.8
990	(23) H	TVBS	MPEG	
970	(24) V	Star TV(4)	Pal	6.8

1/ TV Singapore 1300-1400 UTC; 2/ Radio TV Brunei 1200-1300 UTC; 3/ Gold Net-9 Aust. 1400-1200 UTC; 4/ Star TV operates with Videocrypt movies after approximately 1200 UTC through evening, balance is mixture of several STAR FTA services. Recently, RTM (Tr 6V) has been employing Videocrypt encoding for some US origin programming. Data verification by Hiroyuki Nagase (Yokohama City, Japan) and Mark Long (Bangkok, Thailand).



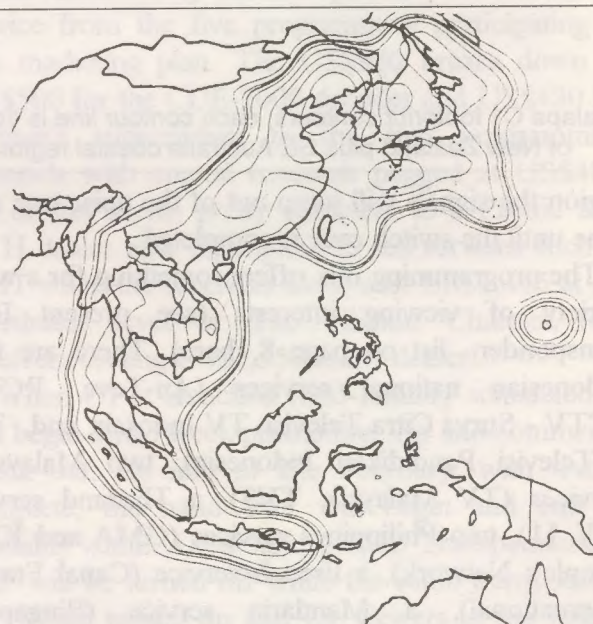
Extended frequency range coverage footprint for 3.4 to 3.7 GHz region (receiver IF 1450-1750) is Asia only with 40 dBw (<1m dish size) at centres.

out to Indian and other cable programmers. And, for the first time, Palapa will also have Ku band capability although, again, not in the direction of the (south) Pacific.

Jakarta Based Programming Service

In theory programming intended for Indonesian pay TV viewers only should not find its way into neighbouring countries. In theory; but in practice, the B-MAC encrypted packages have been available for nearly one year through various "grey market" outlets throughout Indonesia and nearby Malay peninsula countries (including northern Australia).

With the decision of TNT (and MTV; see p. 2 this issue) that DTH services will not be available "at this time" through PAS-2, the further decision of



Palapa C1 Ku band coverage is Asia only with 50 dBw at centres (additional contours down in 1dB steps)

Discovery Asia and ESPN Asia to not accept SMATV nor DTH subscriptions from the Pacific (via PAS-2), the inclusion of these services within the Palapa "DTH Package" basically makes a mockery of the PAS-2 distribution decision by these programmers. Additionally, Singapore based Asia Business News, currently charging approximately A/NZ\$75 per year for DTH service through the MPEG format on PAS-2, ends up on C1 in FTA analogue format.

Further, with The Filipino Channel first agreeing and then rescinding their approval for Pacific dealers to carry their service for DTH subscribers (see this issue, p. 20), the C1 appearance of two FTA Filipino networks (GMA and KBB) on C1 reopens the ex-patriot Filipino population in the Pacific as a market opportunity. Similar opportunities arise with the inclusion of Thailand, Malaysia, Singapore, and Brunei service channels. And the English language services of STAR TV, Gold Net, ANBC and Australia TV International should be popular programming channels in the larger English speaking areas; the more so because of their FTA (non-pay) status which of course means that within Australia there will be no "violation" by people watching these services.

Finally, Canal France International (CFI), a very popular service in Asia and Africa, promises at least the middle and western Pacific areas within line of sight of 113E a backup (if not outright replacement) for RFO when it ultimately disappears from Intelsat 180 in favour of a long threatened switch to MPEG format.

C2M - More To Come

Following quite closely on the January launch of C1 will be the April scheduled launch of C2M. In a formal announcement in August 1994 Palapa said that C2M as a satellite would move into the C1 location at 113E in November 1996 while C1 would go east to 118 to replace B4, B4 would go west to replace B2R at 108 and B2R, the odd man out would go east to 150.5E as an inclined orbit spare. Then C2M's launch was moved ahead from November to April and where B4 and B2R will end up after April has not been announced.

C2M has the capability to operate quite differently than C1; for one thing, it has a special antenna system that is capable of placing a 38.5 dBw signal over New Zealand (try a 1m antenna!). However, Palapa's operating format for C2M will remain a business secret for a few more months. The real fun is obviously just beginning.

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-Part One-

More Prolific Than Video

The exchange of 'data' (transmissions carrying non-video information including audio) via satellite is big business; larger in fact than the television which we all encounter on a daily basis. Most of this 'data' is not intended for public use, and within each political jurisdiction (country) laws may apply to the "interception and use" of this data by anyone other than the intended recipient(s). In other words, such 'data' transmissions are largely "private" in nature and while it is usually legally permissible to "intercept" the transmissions, any commercial use or "divulgence" (sharing with others) of the content of such transmissions is almost always prohibited by regulation or law.

Think of it this way. Suppose by some accident of nature into your home or shop there suddenly appeared tens of thousands of telephone conversations, business communiqués and computer links. None of these are addressed to you. You cannot ignore their presence; but, you can ignore their content. And should you find it impossible to ignore the content, you may not divulge (share with others) any content that you happen to observe.

Not All Are Private

If you come into the world of satellites from other areas in electronics, you will be aware that within the so-called short-wave spectrum (2 to 30 megahertz) there are thousands of transmitters sending out messages 24 hours per day. Some of these transmissions are public in nature (such as the Radio Australia broadcasts) while others are not. If you are familiar with these short-wave services, what follows will be impressive.

Short-wave radio's spectrum (2-30 MHz) has carried the bulk of the world's long distance radio communication circuit needs since the 1920s. Somehow, often with conflict, tens of thousands of transmitters spread around the globe share this limited spectrum resource. Focus on the 28 MHz of spectrum "space" involved here.

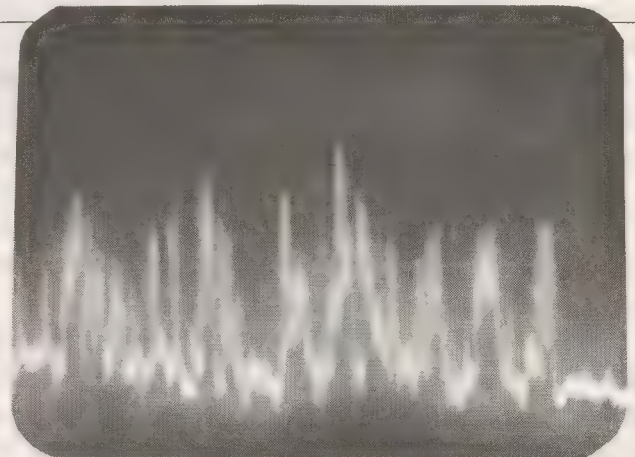
A satellite with 27 or 36 or 54 MHz wide transponders offers equivalent amounts of spectrum multiplied by the number of transponders on board the satellite. A satellite such as PAS-2 with 16 C band and 16 Ku band

transponders has a total spectrum of 1,050 MHz. Thus PAS-2, alone, has spectrum "room" to fit in 37.5 complete 28 MHz width "short-wave spectrums." And unlike short-wave, this "spectrum" is not subject to all of the ills associated with short-wave (fading signals, interference, solar storm signal outages). It is little wonder that heavy users of the short-wave frequencies such as Deutsche Welle, BBC, Voice of America and dozens more have moved to satellite as a primary method of programme material distribution.

Techniques of Using Satellite

Think of a satellite as a signal (transmission) relay device. If you operate a transmitter on the proper frequency, and direct the transmitter energy at a satellite, the satellite will receive the signal, amplify it, and rebroadcast the signal back to earth on a new frequency.

Now think of a 36 MHz wide transponder. Within that transponder there is room for approximately 3,600 separate BBC or Deutsche Welle short-wave quality (10 kilohertz wide) audio programme channels. This means that 3,600 separate uplink transmitters, each operating on an assigned frequency designated by the satellite operator, could relay their material through the transponder. If there are 13 of these 36 MHz wide transponders on a satellite (which describes an Intelsat VII series satellite), and if the satellite operator rented out all of his transponder space for 10 kilohertz wide radio transmissions, this would suggest 3,600 uplink transmitters per transponder times 13 transponders or



On spectrum analyser, these 'carriers' appear as discrete signals; in fact, each 'blip' (carrier) may contain several hundred discrete narrowband channels!

46,800 uplink transmitters (!). And that would be just for one satellite. Obviously this is not the best way to operate a satellite system.

Another way to accomplish the same thing is to create a single transmitter for the full 36 MHz bandwidth of the satellite transponder; this is what a TV transmitter does and it fills the full 36 MHz with TV picture (and sound) information. But rather than connecting a TV image and sound to this 36 MHz wide transmitter, we now connect a series of interconnected "multiplexed" narrow band signals. In this way we eliminate 3,599 of the individual uplink transmitters, replacing them with one 36 MHz wide transmitter that in turn is "fed" by 3,600 separate "channels." And each "channel" is now a discrete audio quality programme. Obviously operating one uplink transmitter "fed" by as many as 3,600 separate audio channels is a superior system to allowing 3,600 separate full uplink transmitters to access your transponder.

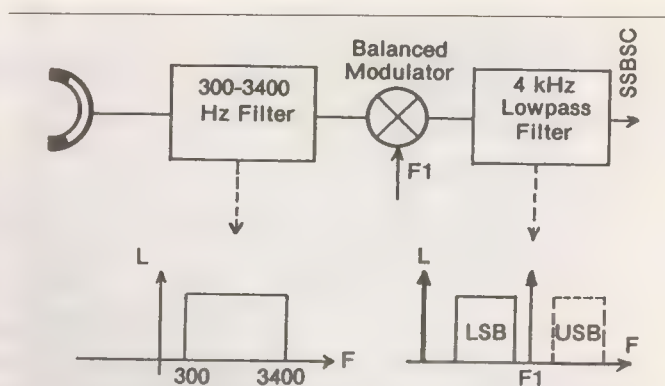
The key words are:

Multiplex: A technique for adding together two or more unrelated signals into a single "information stream" so the stream can be monitored and operated as if it were a single programme transmission standing all by itself;

Channels: In this instance, each programme source is assigned a space within the transponder spectrum and for lack of a better name, it is known as a "channel."

There is nothing magic about 10 kilohertz wide (radio) programme channels other than this being an approximation of the bandwidth of what most people consider medium fidelity AM (amplitude modulated) radio programming. An AM radio station (such as you have in your town for local and national radio outlets) must be capable of transmitting speech and music and for most listening purposes this means a 10 kilohertz or so "bandwidth." Suppose, however, you have no need to transmit music; your requirements are only that the circuit be capable of reasonably accurate reproduction of the tones found in an "average" human voice. Do you still need a 10 kilohertz bandwidth? The answer is no, you can get along with a bandwidth of approximately 3 kilohertz. So if you were designing a system that would transmit only voice, you could reduce the 10 kilohertz bandwidth used by broadcasters such as the BBC to 3 kilohertz and most users (listeners) would notice only a slight change in the voice quality. A telephone system standard calls for a "voice bandwidth" in the 3 kilohertz region.

Return now to our 36 megahertz wide transponder. If this is sufficient bandwidth (room) for 3,600 "audio programme channels" each 10 kilohertz wide, how many 3 kilohertz wide "voice channels" might fit into the same



Voice grade circuits are processed by 300-3400 hertz bandpass filter and fed to 'balanced modulator'. A 4 kilohertz (kHz) filter at the output of the balanced modulator eliminates one of two sidebands to create discrete 'single sideband' voice grade channel.

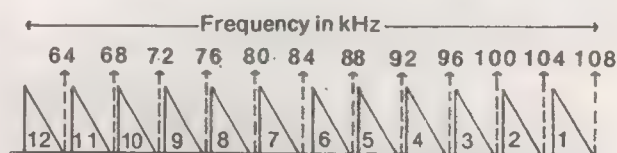
36 megahertz? The answer is 12,000. And once again, it makes no sense to allow 12,000 telephone users to each have their own uplink transmitter when you can multiplex them all together into a single uplink transmitter for transmission to the satellite. Let's give this system a name; frequency division multiplex or FDM.

FDM-fm

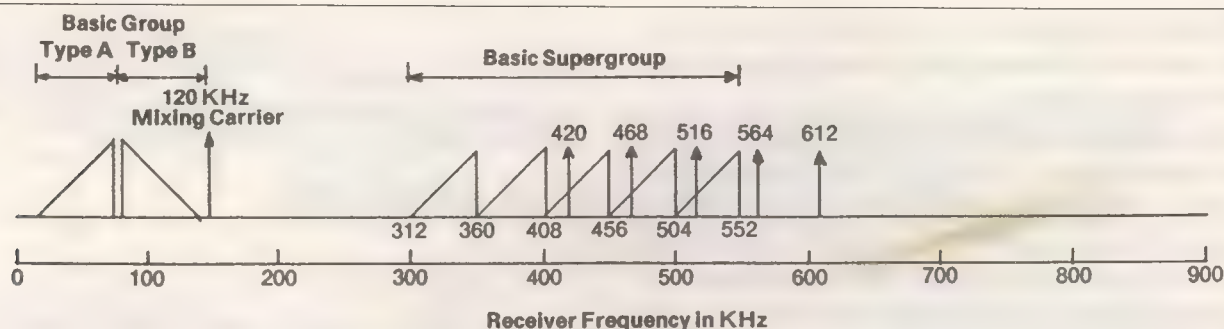
Throughout the world today on 22 Intelsat satellites there are an estimated 160,000 "public switched" channels in operation. Not surprisingly standards have been adopted to allow transmit and receive system modules to be interchanged. This means a piece of equipment functioning with Intelsat in Bangladesh could be removed from its rack position and taken to South Africa or Alaska and it would function the same.

The basis for the system originated from the telephone industry of 30 years ago, a time when Intelsat was being established with lots of telephone industry input to set standards. And in fact many of the modules one finds at an Intelsat installation can also be used, as is, in a terrestrial wire or microwave telephone system.

In this original system a voice grade "channel" is 3.1 kilohertz or 3,100 hertz in width. The actual bandwidth for each such channel is 300 hertz to 3,400 hertz since this frequency range has been found to best carry the human voice. To eliminate information below 300 hertz



Each single sideband audio/data signal modulates a discrete carrier as a part of a 12 carrier "Group." The Group is then processed as a 'bundle', either alone or when combined with other Groups.



Add together five Groups and you have a Supergroup. A basic Group, although starting off in the 64 to 108 kilohertz range, can be electronically "mixed" to any portion between 64 kilohertz and 10.75 megahertz (see text).

and above 3,400 hertz audio filters are employed. After filtering, each voice channel occupies the spectrum 300-3,400 hertz (0.3 to 3.4 kilohertz).

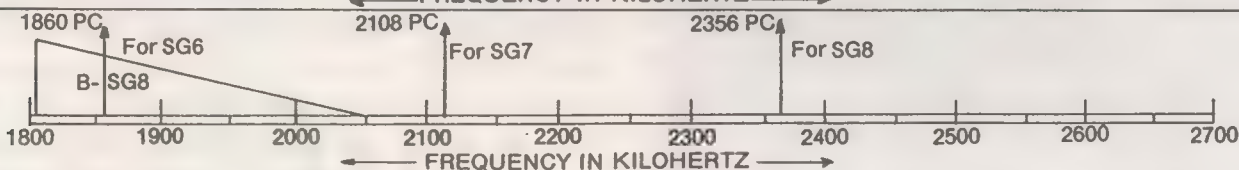
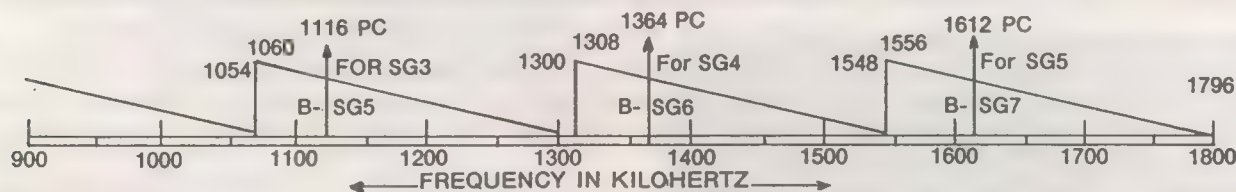
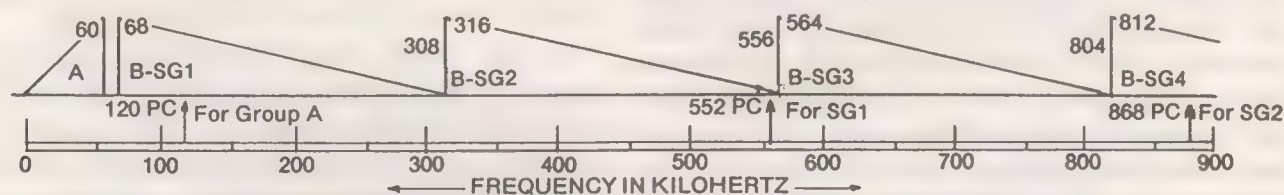
Individual voice grade channels are mixed together for transmission (or at the opposite circuit end, reception) purposes using a system based upon "groups." Groups are formed so that bundles (two or more) voice grade channels, once processed, can be carried within the system as a package. In this way groups can be routed by the system as bundles rather than having to deal with individual voice channel routing. For example, a group of channels can be assigned as originating in Anchorage, Alaska and they travel together as a bundled group to whatever destinations are required. This means a group from Anchorage can be addressed to London, or Melbourne or anywhere else world-wide. At any given instant perhaps only one of the actual voice channels assigned to interconnect Anchorage and Melbourne may be in use (i.e., you would hear, if listening, someone

speaking on that voice channel) but within the same group another set of same-group voice channels would be available for use.

Groups are processed as radio frequency (RF) bundles. The standard is that a Group will consist of 12 separate voice grade channels bundled together occupying a portion of the radio spectrum between 64 and 108 kilohertz. This is illustrated on page 11.

Individual voice channels are processed into a single (lower or upper) sideband format; this eliminates redundant information and provides a clue to the type of receiver required to recover audio from the individual voice channels. A standard 64-108 kilohertz module contains individual channels located at 4 kilohertz spacings from 64 to 108 kilohertz (illustrated). This is a "Group."

Alas, a Group is limited to 12 voice grade circuits and while this may be considered the minimum number of voice channels required for a point to point service (such



Spectrum for typical narrowband transponder user; PC is (unmodulated) pilot carrier, SG designates Supergroup and stand alone numbers at top of vertical marks indicate pilot carrier frequencies. Group below 120 kHz pilot is typically in lower sideband mode, those above typically in upper sideband. Group, Supergroup or Mastergroups are typically bundled based upon point of origination. Larger (Master) groups typically originate in large centres (Los Angeles, London) while smaller (Groups) originate in smaller centres (Anchorage, Papeete).

as Anchorage to Melbourne), it hardly represents the maximum number of voice circuits that might be required on a "path." This gives birth to the Supergroup. A group occupies 48 kilohertz of spectrum (12 x 4 kHz) while a Supergroup occupies 240 kHz of spectrum. And when still more voice grade circuits are required, we have the Mastergroup which occupies 1,232 kHz (1.232 MHz) which is five of the Supergroups plus an 8 kHz wide buffer or 'guard band' between Supergroups..

Tuning In

Although the original voice channels start out as amplitude modulated lower sideband signals, they may travel from the uplink to the satellite and back to the downlink as frequency modulated 'bundles' or in some form of more exotic modulation. In the original system, a standard 36 MHz wide transponder was frequency modulated over a baseband frequency range of 0 to 10.75 MHz. Thus we have a built-in limit of 10.75 MHz of "baseband spectrum" for each transponder use.

To tune in these signals requires the following:

- a) Point the dish at a satellite carrying narrowband transmissions (such as I174E, I177E, I177W);
- b) Tune the satellite receiver to a transponder carrying narrowband transmissions (such as 3,923 MHz on I177; IF of 1,227 MHz);
- c) Connect a piece of coaxial cable from the baseband (video) output on the satellite receiver to a communications receiver capable of tuning the range 0.1 to 10.75 MHz in either upper or lower sideband;
- d) Tune the communications receiver from the lowest frequency available (such as 100 kilohertz) upward to 10.75 MHz. If the voice traffic you hear sounds like Donald Duck speaking through a barrel, try switching to the alternate sideband (i.e., lower to upper or vice versa).

This works only when the satellite link is employing FDM-fm format and when the signals are not otherwise encrypted or disguised. The satellite TV receiver must be adjusted for the centre of the downlink channel if it is to recover at the video output the original amplitude modulated signals in lower or upper sideband format.

What You Won't Hear

Groups (of any size) are one-way circuits and when intercepted you hear only one side of a typical conversation. The other side? Simultaneously transmitted in the reverse direction in another Group; probably on another transponder. Exceptions to this include conference calls, credit card verification and hotel reservation circuits. You also will not hear non-FM formats (of which there are several).

Many users of Intelsat (as well as Rimsat) in the Pacific do not have the luxury of fully developed terrestrial telephone networks. In these cases, the Group

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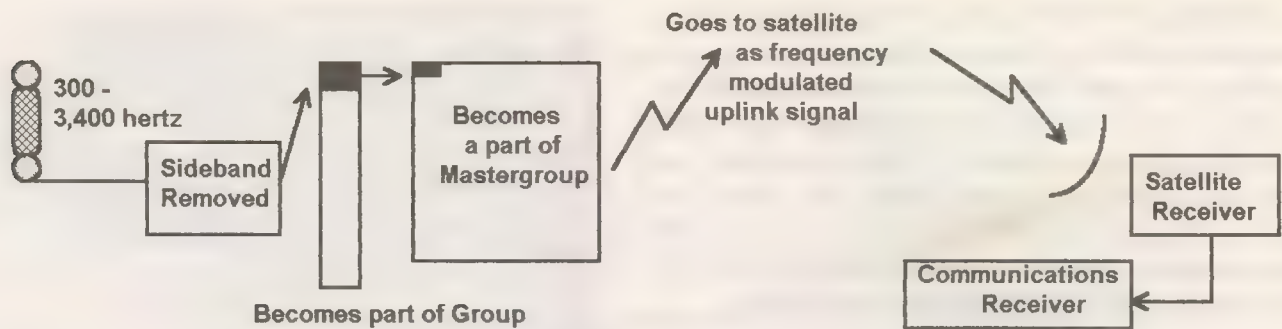


**Emily Bostick
President**

Glyn Bostick and I have served American CATV from its start and developed many of the CATV/satellite filters now standard in the industry. We are excited at the opportunity to solve the increasing CATV interference problem.

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SatFACTS September 1995 ♦ page 13



Groups of up to 12 voice grade circuits are multiplexed. When more than 12 circuits are required from an originating point, Groups are further multiplexed into Mastergroups. These bandwidth segments become a part of the uplink signal that is frequency modulated to the satellite. The frequency modulated signals are received by a standard satellite TV receiver and produce baseband (0 - 10.75 MHz) signals that are now back in their amplitude modulation (AM) format at the video (baseband) output terminal on the satellite receiver. By connecting this receiver output to a communications receiver antenna terminal, and tuning the 0 to 10.75 MHz spectrum in lower / upper sideband mode, you recover the original (single sideband) voice material.

/ Supergroup / Mastergroup format is not employed. The substitute for this is SCPC or single channel per carrier.

SCPC allows a single uplink transmitter at a remote site to send (in some form of FM) one or more audio links into the Intelsat (Rimsat) system on a stand-alone basis. The uplink may have the capacity for a single voice grade circuit, or, there may be a simplistic form of multiplexing employed to group up to 12 separate voice grade links through the common uplink transmitter. In virtually all SCPC situations the power to the satellite is far below the power found with a typical full transponder uplink. And, correspondingly, the signal level you will find coming back will also be reduced.

Lacking a full transponder filled with multiplexed signals, the technique to tune-in these truly narrowband links changes from that described as follows:

1) Rather than demodulating the full (frequency modulated) transponder with a standard TVRO receiver, you use the receiver only as a 'frequency processor';

2) The actual (FM) receiver must tune through the receiver generated IF (intermediate frequency) range.

First you adjust the TVRO receiver to a specific downlink transponder. Then by tapping into the TVRO receiver's "IF Loop" you feed this IF signal into a suitable FM receiver and tuning through the IF 'band' you locate and demodulate the individual (SCPC) carriers.

Finally there is the third, more recognisable to satellite TV enthusiasts, method of transmitting non-TV audio programme material. In this system, extra audio programme channels are carried within a TV transponder. An example of this is quickly found on I180, 3975 MHz (IF1175); Worldnet. There, by tuning your TVRO receiver's audio subcarrier tuner (in the narrowest audio bandwidth position you have available) you will find Voice of America English and Spanish (7.0 MHz), French and Spanish (7.2), Vietnamese and Tibetan (7.35), Laotian and Korean (7.45), Mandarin (7.53) and English (7.6).

We'll explore more of this subject in SF#14.

-FEEDback-

Reader Peter Ball (Raumati Beach, Wellington) suggests we have confused our voltage and power in SF#11 (p.14). He is correct. We said, in error, that a 3dB decrease in signal level halves the signal voltage. We should have said that a 3dB decrease halves the signal power. In fact, as Peter properly notes, having the voltage results in a signal drop of 6dB (not 3). He continues:

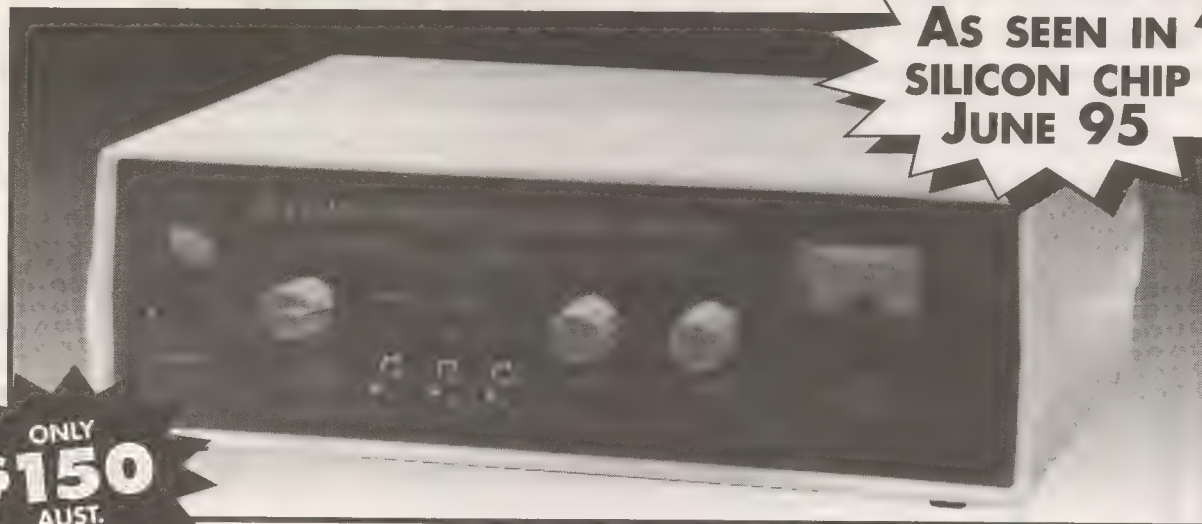
"Doubling the number of channels handled (in a MATV amplifier) means that to maintain the total power output constant and avoid overdriving the amplifier, the power available to each channel must be halved and each channel has to run at a level 3dB lower; i.e., half power. When setting up a system with a spectrum analyser (which displays [signal] voltage on its screen) you set the channels up to 70% of their previous level to achieve the 3dB drop to half power, not 50% as inferred in the article." Thank you, Peter.

Ron Boyce (Alexandra Hills, Qld) wants us to correct a statement appearing in SF#12, p. 22 regarding problems with TV Oceana's Japanese language service on A3/B3, IF 1344. We said, "*Boyce and others report that TV Oceana has put pressure on newspapers in the area not to accept advertising from the dish dealers...*" In fact, Boyce did report the problem to us but says he has taken a very low observer profile and is not engaged in the commercial battles now underway in Queensland on this issue. Fair enough.

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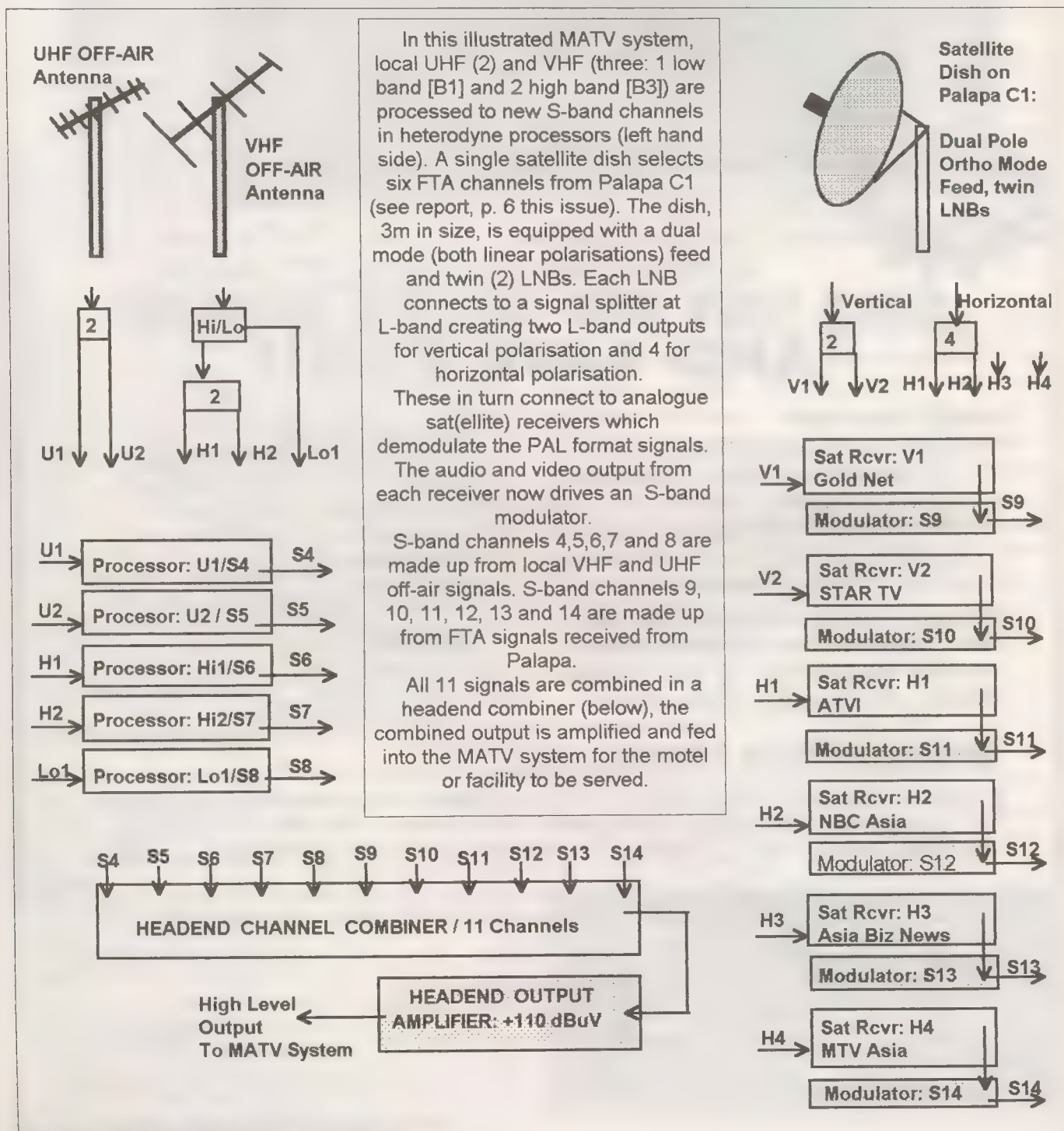
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ADDING SATELLITE CHANNELS TO A MASTER ANTENNA SYSTEM

Tying It All Together

During the past five issues, SF has introduced you to the basic design problems facing a planner who wishes to add one or more satellite delivered channels to an existing MATV system. There are three areas of design concern:

- 1) The headend which must balance the signal levels from both existing and new channels to ensure uniform reception quality at each TV receiver connected into the system.
- 2) The distribution system must be capable of passing the new channels without overloading any existing line



amplifiers and without allowing the newly added channels to create adjacent channel interference to the pre-satellite channels.

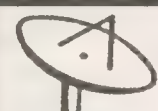
3) The television receivers connected to the system must be capable of tuning in the new channels.

The system drawing appearing here depicts an idealised system consisting of 11 channels; 5 taken off air (UHF and VHF with the UHF converted to VHF S-band channels and VHF moved to S-band channels as well) plus 6 taken off of the Palapa C1 satellite. In the example shown, all satellite channels are presently free to air (FTA) and thus the motel operator would incur no monthly programming fees with this particular channel selection. There is nothing here that says the motel operator cannot mix pay TV and FTA channels, and the motel system could easily install two or more satellite antennas to have a broader selection of both FTA and pay services as well. The C1 channels shown are used for illustration because they reflect satellite service levels which will function well with 3m or smaller dishes over all of eastern Australia as well as New Zealand. By avoiding pay TV channels, Australian ABA regulations that prohibit such services under most circumstances (until 1 July 1997) are mute; in other words, an Australian motel will break no ABA rules by carrying the services suggested here.

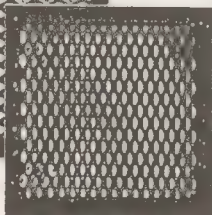
Why S-Band Channels?

As discussed in earlier segments in this series (SF# 9 and 10), existing off-air channels may create interference problems for coaxial cable distributed services. The easiest 'clean method' of eliminating these problems is to simply rechannel the entire system; move the off-air VHF channels to new channels using signal processors, move UHF to new lower (VHF) channels with processors, and then add the satellite channels using CATV grade modulators.

S-band channels (SF#10, p.7) occupy spectrum which is not ordinarily utilised for television distribution. And some "cable ready" TV receivers (Sanyo, Goldstar, Panasonic et al) now available tune these S-band channels along with the regular band I and III normal VHF channels. The S-band channels generally fall between 105.25 and 294.25 MHz which places them higher in frequency than normal band I TV channels but between bands I and III, as well as above band III. A motel upgrading its MATV system to utilise S-band channels will either replace existing VHF band I and III only TV sets with newer sets that tune S-band, or, for less money the motel can add cable TV set-top converters. The set-top units are designed to tune virtually any TV 'channel' between 48.25 and at least 294.25 MHz (some extend further to 463.25 MHz). The set-top converter units cost less than A/NZ\$75 at the



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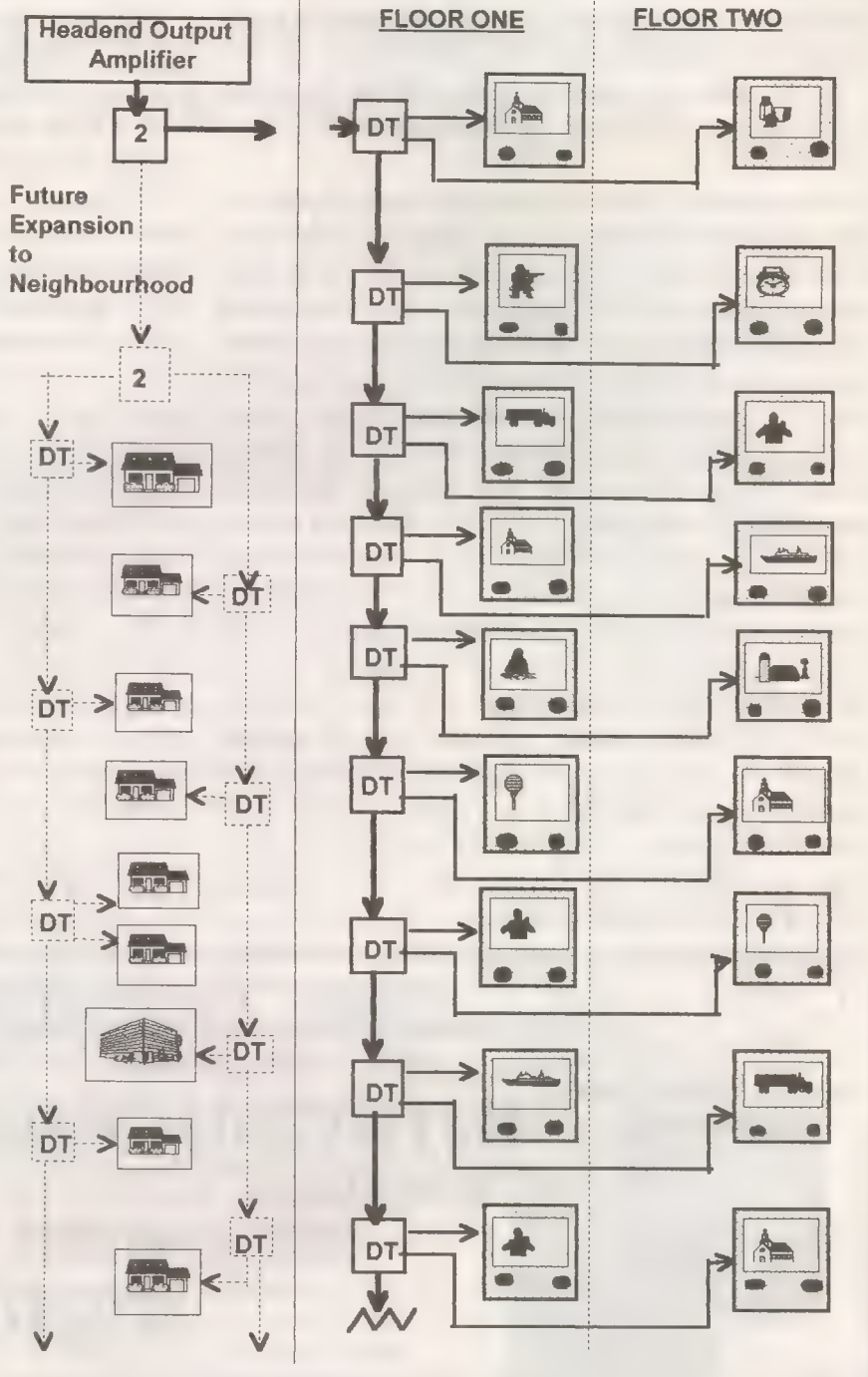
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The MATV 'Plant'

With proper planning, the addition of satellite delivered TV programme channels to a motel / hotel / campground facility can ultimately lead to expansion into a "Neighbourhood Cable TV System" as described in SF#7 - 12.

From the output of the headend (diagram page 16) the signals are transported in coaxial cable to each TV set on the property (right hand portion of diagram here). Individual room outlets are connected through "directional taps (couplers)" and each DT is selected based upon the main (trunk) line signal level at the point of DT installation. DT values vary based upon trunk line levels. In this way each TV set receives a measured amount of signal typically in the 65 to 75 dBuV (+5 to +15 dBmV) region. DTs are available with 1, 2, 4, 8 or more outputs per DT unit; each output connects through a piece of coaxial cable to the input on the television receiver, or where applicable, a CATV grade set-top cable converter to allow individual viewer access to all of the channels on the system. Planning ahead for expansion to serving "the neighbourhood" with the same channels is as simple as installing a two-way splitter at the output of the headend amplifier (shown in diagram to immediate right, top). This output will then feed signals through CATV grade coaxial cable, subsequent subscriber taps, splitters and amplifiers. In this way the MATV system is able to expand into a revenue producing system beyond the motel property.



installing dealer level when purchased from sources in Taiwan (see SF#10, p.9). It is also possible in some systems to stay with the available band I and III channels, thus avoiding the expense of new TV sets or cable set-top converters but far greater care is required with the processing of off-air VHF channels in this instance (see SF#8, p.11).

A properly designed and adjusted headend will provide true adjacent channel system performance (i.e., TV programme channels adjacent to one another in the spectrum) and modern TV receivers will have no difficulty tuning individual channels without interference.

Satellite and Channel Selection

At the present time selection of an appropriate satellite, and programming channels, is very much a gamble. In a single dish system, logic suggests you would select the satellite that offers the widest possible choice of programming, including perhaps some that you will not initially (if ever) use. Most motel type system operators are more interested in FTA services than pay although some of the services are so unique as to attract a following even if a fee is required.

PAS-2 will ultimately become a pay only service satellite; that's the safe view. That means that services presently FTA (CNNI, ANBC, NHK) will eventually encrypt. As reported elsewhere in this issue (see p.2) programmers such as TNT (+ Cartoons) and MTV have

settled on a non-DTH policy and they are still defining a minimum size for SMATV (satellite master antenna) systems to qualify as affiliates. It is unlikely that long term these services will agree to affiliate with any subscriber representing fewer than 100 subscribers (or US\$100 per month minimum payment).

However, a dish installed today and pointed at PAS-2 can (if properly positioned) easily be shifted to Palapa C1, AsiaSat 2 or other yet to come satellites at some future date. Just be certain as you decide where the dish will install on the property that your look angles towards Palapa and AsiaSat are 'clean' (i.e., not blocked by trees, hills or buildings). In this way the dish can be shifted to a new satellite without having to be physically moved to a new location.

Another consideration is the selection of a feed for the antenna. Fortunately, PAS-2, C1 and As2 are all linear (vertical and horizontal) in polarisation. This suggests any dish installed would for commercial purposes be equipped with an "Orthomode" feed (i.e., ADL OR-100; Chaparral Dual Feed). This type of feed provides two separate LNB mounting flanges or plates, one for an LNB to the vertical signals and one for the horizontal signals. By bringing two separate LNB feedlines into the equipment room, you can then split the signals into voltage parts to allow two or more separate receivers to be connected to each polarisation. With Palapa C1, a four-way (L-band rated) splitter connected to the horizontal 'side' will produce separate feeds for Australian Television International, ANBC Asia, Asia Business News and MTV (see diagram, p. 16). Similarly, a two-way splitter on the vertical 'side' provides separate receiver feeds for Gold Net and Star TV. Two, (three), four way L-band splitters may be configured to take as many as 12 separate feeds from a single polarisation of a single satellite although beyond a four-way splitter may require addition of a line amplifier as well.

Once you have the separate feeds going into receivers dedicated to full-time recovery of a specific service (such as ATVI), the video and audio (baseband) output of these receivers connects to separate single channel modulators. They are available on a factory-tuned channel or with field resettable channels. The relatively high level output of the (single channel) modulators are fed in turn to a "Channel Combiner" box that properly impedance matches each of the channels into a single output line. In most systems, you will follow the Channel Combiner with a broadbanded high level output amplifier to gain enough signal to reach to the ends of the MATV system (diagram, p. 16).

And thus you have successfully married off-air signals and satellite signals into a single coaxial cable for distribution to as many TV receivers as your system may require. Yes: There is a business here.

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PAL-B VHF / UHF PROCESSORS

CATV quality rack mounting processor, fully field adjustable for input and output channels. Input 46 - 870 MHz; output 40 - 550 MHz. Output level +120 dBuV, input threshold as low as 50 dBuV for clean output. Last channel memory, sound carrier level, audio and video modulation user adjustable. SAW filter for true adjacent channel operation; as low as NZ\$1,182.43 (+gst).

CHANNEL COMBINER

CATV quality 12 input / 1 output channel combiner, rack mounting, covers spectrum 40 - 600 MHz, full shielding, high isolation, test point for measurements. As low as NZ\$240.89 (+gst).

HIGH LEVEL OUTPUT AMPLIFIER

Gain bandwidth 45 - 550 MHz, gain available 40 dB at maximum with 0 - 20 dB gain control range AND 0 - 20 dB tilt control range. Push-pull hybrid amplifier for maximum reduction in cross mod and inner mod products. Outstanding noise figure of 7 dB. Input and output F fitting test points at -20 dB. Operates 230vac, 50 Hz. As low as NZ\$259.88 (+gst).

LOCAL ORIGINATION

The ultimate local channel for motels, cable TV systems: Hundreds of memory pages, 92 font/size combinations, multi-direction scroll and crawl, fades, wipes and more. And Lithium battery backup! Details:

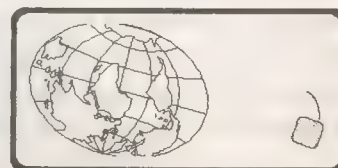
FAR NORTH CABLE TV Ltd.
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 Fax: 64-9-406-1083
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a technical and marketing advisory
memo
to the membership from your
industry trade association group

SPACE Pacific

Satellite Programme Access CommittEe



A trade association for users, designers, installers,
sellers of private satellite-direct systems in the POR

CORRECTION

This membership report appearing in SF#12 stated that SPACE Pacific and the Filipino Channel had come to an agreement that would allow distribution of "TFC" throughout the (south) Pacific region. This, regrettably, turns out to be in error, the result of a misunderstanding that arose during the course of repeated telephone exchanges with "TFC" personnel.

We wish to correct the SF#12 report at this time. ABS-CBN (the controller of the Filipino Channel) has not, verbally or otherwise:

a) Negotiated, promised or entered into an agreement for the distribution of "TFC" through SPACE Pacific Limited or its members (*);

b) Made an agreement as to fees or subscription that ABS-CBN is likely to want or at which it expects to sell its services in (this) the region;

c) Entered into an agreement to allow free preview of "TFC" by SPACE Pacific Limited members;

d) Entered into any agreement, authority or request for the ordering of GI receiving equipment for the purpose of receiving "TFC";

e) Entered into an agreement to authorise and/or initialise such a (GI receiver) instrument even if it (is) obtained without the permission of the (GI) licensed broadcaster;

f) Entered into any other agreement whatsoever.

SPACE Pacific has received an apology from ABS-CBN for this misunderstanding and we in turn convey our apology to ABS-CBN and our members.

* / To the best of our knowledge, no agent or agency has yet been appointed by ABS-CBN for their service in the (south) Pacific.

Members who had queried sources for the required ABS-CBN receiver (the GI DSR 1500) are advised to terminate those queries as ABS-CBN does not appear to be ready to appoint a representative at this time.

Chinese Television Network Appoints

Mandarin language programmer Chinese Television Network (PAS-2, TR2 in Scientific Atlanta MPEG format) has apparently selected at least one regional distributor for its service. SPACE member firm Westlite Electronics (117 Peninsula Road, Maylands, WA 6051; tel. 61-9-370-5573, Fax 61-9-272-3060) advises "*We are pleased to inform that (our firm) has been appointed to be a CTN agent to distribute their Zhong Tian channel to hotels and DTH (subscribers) in Australia.*" During June, CTN's K.F. Lau visited with numerous prospective agents in New Zealand and Australia with the intention of selecting firms to represent them in various geographic areas. Westlite's Harry Guo is, to our present knowledge, the first to be accepted. In New Zealand, several firms that had individually made application to CTN to represent the service have recently come together to form an alliance that is hopeful of receiving the appointment. The up front costs to become the CTN agent for New Zealand are considerable and the group hopes that by spreading those costs amongst several subagents in different geographic regions of the country, they can bring the service to New Zealand. Those interested in participating should contact Telsat Communications (64-9-356-2749) after September 26.

Programming Representation - A Business

A clear trend is now developing among programmers to seek out firms to represent them in well defined

BECOMING A 'MEMBER' OF THE 'SPACE TEAM'

Membership in SPACE Pacific is an optional extra in our industry. SPACE is our South Pacific regional trade association, initially formed to lobby for greater access to programming benefits from cable oriented programmers who have shown little interest in DTH subscribers through PAS-2. With the approach of AsiaSat 2, Palapa C1 and the turn-on on JCSAT-3, an entirely new breed of programmer is becoming available to Pacific region DTH and SMATV viewers. There are four levels of SPACE membership available including individual private dish owner, dish installer / dealer, SMATV / cable system operator and equipment and programme supplier. For a no obligation membership packet, use card on page 30 in this issue of SatFACTS.

geographic areas. This was the original premise of SPACE Pacific: To convince programmers they should make their programming available to individual homes, SMATV systems in addition to the more obvious cable TV and MMDS (pay TV via microwave) firms. What SPACE did not properly anticipate was the value that programmers might place on the representation arm of their business.

A recent exchange between a SPACE member firm in New Caledonia and ESPN illustrates. Our member was interested in providing ESPN to hotels and other commercial establishments in his country; he had been told early in the exchanges that ESPN would not authorise any DTH subscribers. Why? Because programmers such as ESPN have very little real control over how their IRDs will be used by viewers; a unit that is supposed to be in a private home could well end up serving several hundred rooms or several thousand homes in a commercial installation and ESPN (and others) are unwilling to chance this misuse of their programming. This has been a particular problem in some Asian countries where DTH units have been repeatedly found to be in use by commercial users, at DTH fees rather than the much higher commercial fees (higher because rather than serving one TV set, the units serve hundreds or thousands). To avoid this problem, ESPN and others including TNT are simply refusing to deal with DTH where they have no effective way to police IRD use.

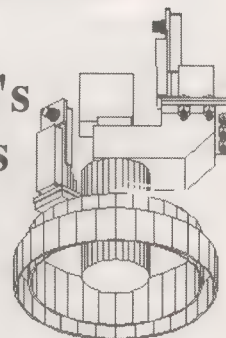
In the case of New Caledonia, ESPN requested a minimum monthly payment of US\$19,000 which it suggested represented 3,800 individual rooms (hotel or motel) subscribing to the service at US\$5 per month. For our member to be appointed by ESPN, he had to be willing to put up two months advance lease or US\$38,000. And this was before he could actually obtain decoders and begin to market the service. The rate suggested was US\$5 per month per hotel room, US\$100 per month per bar or restaurant.

TV programme distribution is basically a numbers game. The last official census records for New Caledonia state there were 153,700 people there in 1988. That the entire country might have 3,800 hotel / motel rooms seems quite unlikely to us but based upon 153,700 population (44,700 actual homes), ESPN was basically asking for a guarantee that 9.4% of all "homes" in New Caledonia would subscribe to the service. That is a pretty stiff guarantee. No, our member did not accept their offer.

When services such as CTN demand US\$20 per month for their programme channel (paid a year in advance), the guarantees become a major stumbling block to finding someone capable of representing them. Rationale programming rates are still a hotly debated subject and will continue to be for perhaps another year.



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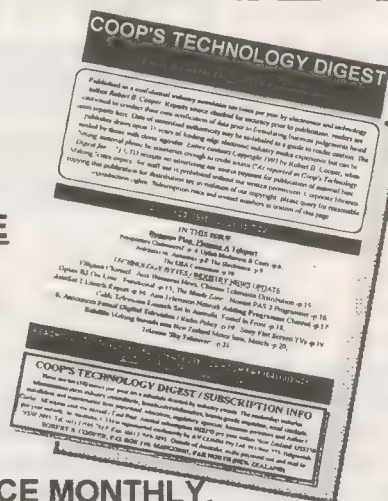
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 THAN
 COOP ONCE
 PER
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COOP TWICE MONTHLY.

The "hidden Coop," better known as COOP'S TECHNOLOGY DIGEST, is published ten times each year. Each issue focuses on a major report topic (the latest issue investigates investing in and operating a satellite uplink station; a Teleport) and then in abbreviated format surveys the entire world of telecommunications with incisive, no nonsense updates on everything from fibre optics to satellite broadcasting. 'CTD' is an industry newsletter for people who need to know, now. Mailed Fast Post world-wide. Sample copy NZ\$10, normal subscription rate NZ/US\$250 per year. Special 1/2 price rate to SF subscribers. Sample from CTD, PO Box 330, Mangonui, Far North, New Zealand.

WITH THE OBSERVERS

AT DEADLINE:

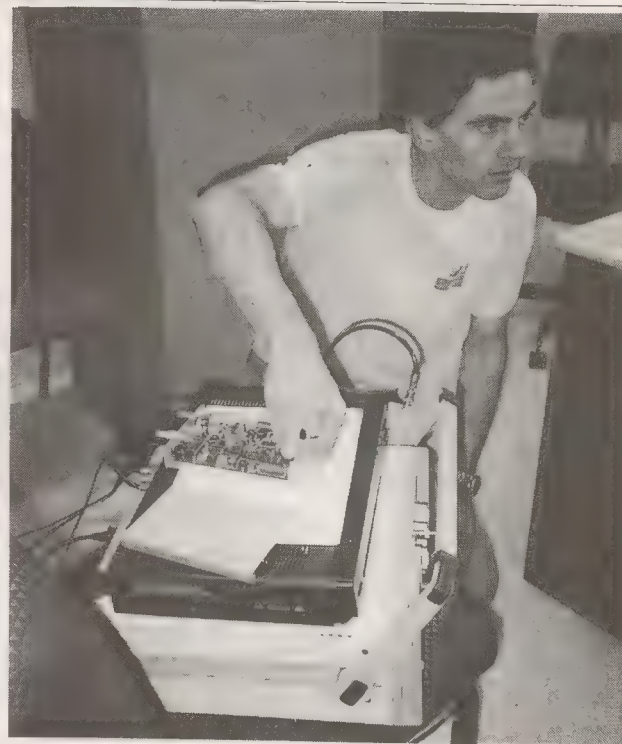
Television Corporation of Singapore (TCS) will begin 18 hour per day Mandarin language programming using S/A MPEG October 1.

1. IRDs will be available through TCS and they are currently looking for distributors. Contact Wendy Woo, Marketing Exec, Television Corporation of Singapore Fax 65-253-3780, Tel 65-350-3806.

JCSAT-3 launch on 29 August went off on schedule and was widely reported on NHK newscasts for two days. Numerous observers reported signals they believed to be JCSAT-3 as early as 1 September. Several carriers in the (IF) 1500 MHz region are widely reported across Australia and much of the Pacific. This is not JCSAT-3. This satellite has C band outputs limited to 3930-4200 MHz (IFs of 950 - 1220); note it does not go down to the 'normal' 3700 MHz band edge. This is because JCSAT-3 is 'sharing' 128E with Russian Raduga 27 (127.6E) and the Russian satellite uses 3400-3650 MHz (IF of 1500 - 1750) for downlinking. One especially strong non-video carrier at an IF of 1530 MHz is reported by several including Kevin Green of Northwest Satellite (Manilla, NSW). If you wish to explore the narrowband content of this Russian satellite while waiting around for JCSAT-3 to actually begin operation, see our report on page 10 this issue. JCSAT-3 should be capable of starting test transmissions about the time you read this. If you have a spectrum analyser, try 3930 (IF 1220) for their 'beacon' signal which will be the first confirmation that JCSAT-3 is 'on station'.

David Nolan (Katherine, NT) confirms our SF#12 report that ABC-5 (Philippines) did revert to FTA analogue for a brief period (July 22-23) but it has subsequently gone back to MPEG. The service programmes many US originated shows and like Palapa B2P's RTM (TV1) it has been under pressure to "encrypt" transmissions as a condition to being licensed for these programmes. How an FTA service such as ABC-5 or RTM can have commercial success when encrypted and when not willing to authorise viewers for its service remains a mystery.

Steffen Holzt (New Caledonia) and others report German Deutsche Welle policy concerning 'conditional access authorisation' for the new AsiaSat 2 MPEG service has been modified. We reported (SF#12, p.21) that while DW will be 'FTA' it would require a "one time (US\$50) conditional access fee." DW advises Holzt and others this will not be the case but to date has been unable to provide precise procedures for having your new DVB Compliant MPEG receiver 'turned on' for DW when the service is available after 1 January. Congratulations to DW for eliminating this fee; stay tuned.

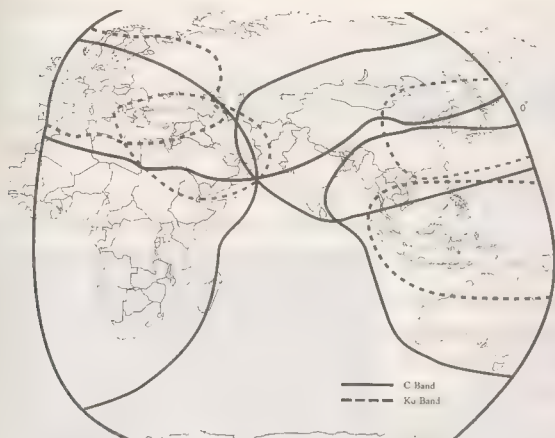


Robin Colquhoun - Auckland based DTH experimenter while adjusting **Digitex** analogue threshold extender during tests at University of Auckland dish.

The Orient Satellite Communications PAS-2 'leaked signal' report in SF#12 (p. 24) has disappeared. The strange Mandarin Ku band service (IF 1034) was widely reported from June to mid-August by observers from western Australia to New Zealand. Our Asia reporters verify it is 'gone' there also, suggesting Orient has either gone out of business or switched to MPEG. Those with spectrum analysers might revisit this frequency on PAS-2 to see if there are signs of a digital signal present.

C band test signals on PAS-4 were reported as early as 20 August by many observers in central and western Australia; we reported on the successful launch of PAS-4 to 68.5E in

WITH THE OBSERVERS: Reports of recent changes in satellite operations, programmer sources, equipment changes are encouraged from readers throughout the Pacific Ocean Region (POR). Information shared here is a valuable asset in increasing our collective understanding of the satellite system 'universe'. Off-screen photos are not difficult to take: Use ASA 100 speed film, set camera to f3.5 - f5 aperture and for PAL or SECAM image set to 1/15th of second (for NTSC, to 1/30th). Adjust TV screen to slightly brighter than normal with normal contrast, hold camera stable or place on tripod. Alternately, record reception on VHS tape (any format, any speed) and send the tape along to us for photographing. Note deadline for October issue is 5PM October 2; you may FAX reports using form on page 29 in this issue.



PAS-4 C (solid) and Ku (dashed) coverage limits based upon shaped beam antennas at 68.5E.

SF#12. PAS-4 went into 'formal operation' September 5; SF is soliciting reports from readers.

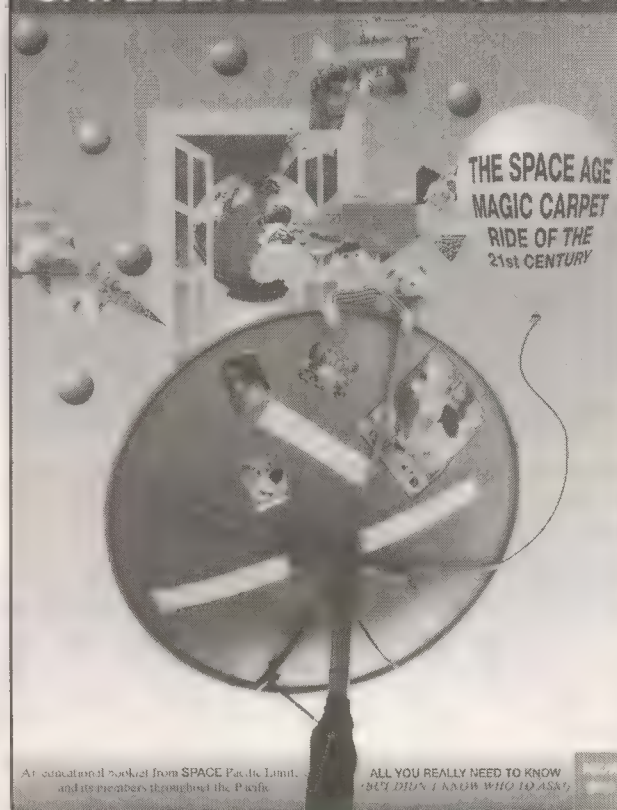
Our report that at least one JCSAT-3 uplinker will be operating from (Kathmandu) Nepal was apparently only the tip of the iceberg (SF#12, p.8). Reports from Indian sources say that several uplinkers are now establishing facilities there, taking advantage of a lack of regulations and the ability to shift funds into and out of Nepal with few if any currency restrictions. The next test card you see may be originating from Kathmandu.

SF could not verify persistent reports that the financial and operational problems for satellite operator Rimsat had reached a crisis stage early in August so we chose not to report the stories we were hearing. Now, however, there does appear to be a significant change in Rimsat operations coming and if the most far fetched of the reports are to be believed, several of the present Rimsat programmers could be replaced with new programmers before year end. Probably not related to these reports, G2's ATN appears to have shifted its operating frequency slightly within TR6 (from 1484 to 1474 IF) which could be a step towards beginning 1/2 transponder operation (two separate programming channels where one now appears). The service has been on-air promoting this move for several months; observers are urged to check and report if you see a second programme channel there. There is one additional interesting possibility concerning G2's TR6: It presently operates in a high power spot beam configuration (see SF#8, p. 4 for coverage map) which creates 46 dBw signals into India. However, by pushing a switch at the uplink site, this spot beam would reconfigure into a global pattern and then the transponder would have the same coverage as G1's RAJ-TV (a 10 dB reduction in India but a significant improvement in the Pacific). It would certainly be interesting to see how this transponder coverage changes if in the Rimsat 'shake out' something does happen to ATN.

Francis Kosmalski (Auckland) and others report the vidiplex (two videos merged together) on I180, TR3 (IF 1385) seems to be gone. This was a feed used by NBC, CNN and various one-off programmers primarily going to Network 10 (Australia). Av-COMM's Garry Cratt believes all NBC and other vidiplexed signals that have been on I180 will disappear by the end of the year, to be replaced by MPEG feeds. A spectrum analyser examination of the TR3 space does suggest there is a low (signal level) digital signal now on that

THE SEARCH IS OVER

SATELLITE TELEVISION



The perfect home DTH and SMATV promotion booklet from SPACE Pacific.

SATELLITE TELEVISION

All You Really Need to Know
(But didn't know who to ask!)

- ✓ 28 pages, four colour cover, excellent graphics
- ✓ Fully explains home DTH, SMATV in terms non-technical people can grasp, understand
- ✓ Answers important questions in authoritative way, assists dealer sales presentation
- ✓ Retail priced at A/NZ\$10 per copy

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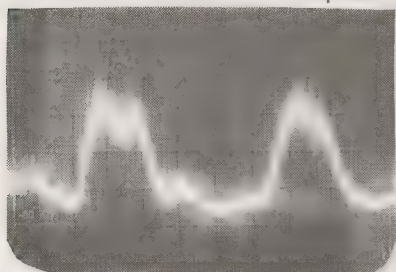
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Order from: SPACE, PO Box 30, Mangonui, Northland, NZ

OPTUS B3 SETTLES IN

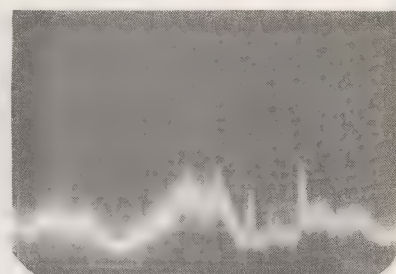
Australia's Optus B3 satellite commenced operations from 156E in mid-August, replacing ageing (Aussat) A3 at that location. B3 was launched to Clarke Orbit August 1994 and has been 'stored' at 151.7E since that time. Within Australia, B3's signal has been a significant (up to 6dB) reduction from A3 in the central areas, directly affecting Imparja TV relays now without signal after the switch over. Signal levels in Western Australia are generally up from both A3 and B1, but progressively 'down' elsewhere further east. Optus had predicted as much prior to turning on B3. From

TWIN GI MPEG carriers: Optus B1



reports around the 'fringes' (i.e., outside of Australia proper) the true B3 pattern better emerges. In the two photos here, the Galaxy MPEG signals on B1 (left) are 6 to 8 dB C/NR at a New Zealand location while the same dish finds the single MPEG carrier (IF 1140, horizontal) barely 3 dB C/NR from B3. From New Caledonia, which benefits from a bulge in B3's coverage that is supposed to take in Norfolk Island, Steffen Holzt finds B3 signals generally weaker than

SINGLE MPEG: Optus B3



B1; the exception being video signals on an IF of 1363 (vertical). Galaxy has not revealed whether the late August - early September "tests" of MPEG on B3 are at full power, or even on the 'high performance beam'. If this is full power and beam, New Zealand can kiss Galaxy service goodbye via the primary Australia beam; at the present level, suitable rain fade protected service would require dishes in the 3.5m and up range best case.

transponder but no verification yet. At various times of day the transponder might continue to be used for analogue fortuitous feeds.

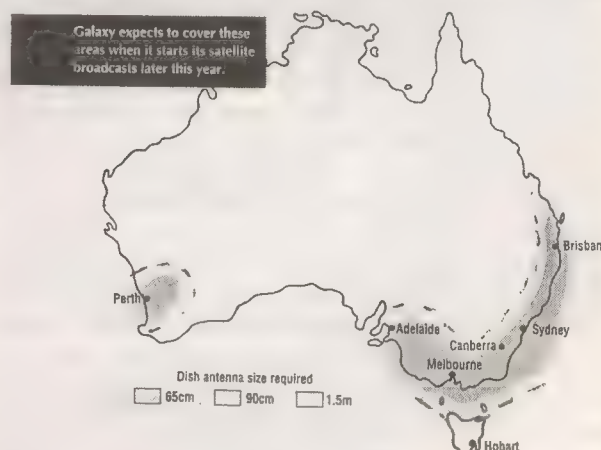
Programming Notes

World Television News (WTN) feeds covering protests and strikes in Tahiti (relating to the nuclear testing) have been frequent and lengthy on I177 and I174 (TR22/23). The test card logo 'WTN Tahiti' alerts you to feeds coming or in progress.

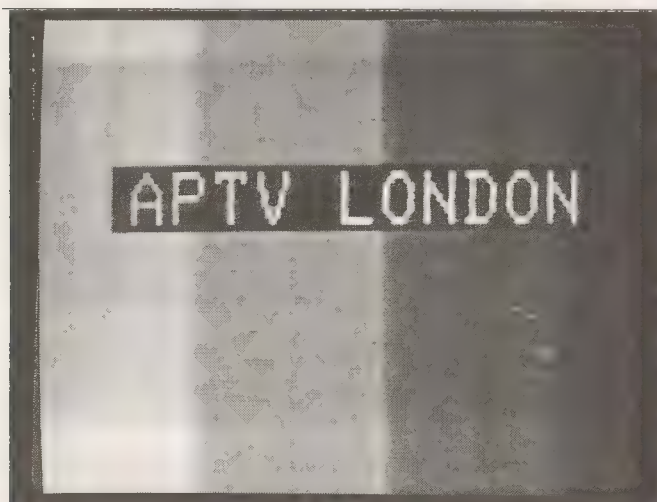
EMTV, Papua New Guinea, continues to attract observer report compliments for the generally improved audio and video quality of their service.

China has elected General Instrument Digicipher MPEG format for delivery of three pay television service channels through Chinasat 5 (115.5E) as well as through some unspecified channel capacity on AsiaSat 2 when it is launched.

Indovision service from Indonesia, now packaging 5 English language channels on Palapa B2P and soon to be on Palapa C1, will also carry new MGM Gold channel. MGM is a major



Perhaps somewhat optimistically, Galaxy released this 'coverage map' based upon anticipated B3 DTH dish sizes. 1.5m contour will not reproduce here; it is only slightly further 'out' than dashed-line 90cm ring.



APTV, previously fed at various times on I180 TR3, now appears on TR9 (IF1274)) mixed with NBC News Channel feeds.

owner of movie product and the producer and rights owner for TV shows that include 'Thirty Something', 'The Outer Limits'.

An (S/A) MPEG format service called The Music Zone (TMZ) is operating on PAS-2 TR9V claiming to be interested in obtaining affiliates. Its MTV-like format could be an alternate programming source; contact Samantha Klosterman in USA; (tel) 303-267-7006 or (Fax) 303-267-7007.

SF#12 unverified report that Australian ABC and SBS may programme in-clear PAL format is being denied by both; if they abandon B-MAC in future, it will be a form of MPEG.

Council (satellite) antenna restrictions. If you are in a position to query your local council offices requesting a copy of any existing rules which specify limits or restrictions on the mounting of satellite TV antennas, SatFACTS would very much like to have a copy of this council material. SPACE Pacific has begun a detailed study of "rules" in this field and plans to compile it as a data base for installers and DTH users faced with this problem. Please send copies of your local council regulations to SatFACTS, PO Box 330, Mangonui, Far North, New Zealand. **And thanks!**

PROMAX MC-944 ANALYSER

You don't really need any test equipment to do satellite TV installation and trouble shooting, provided you have plenty of time on your hands and are willing to sharpen your skills over several years of trial and error. All you really need is a TV set and a satellite receiver to locate a satellite.

On the other hand, if doing an installation for a new dish system in hours rather than days is important to you, and being able to troubleshoot misbehaving systems in minutes rather than hours is basic to your interests, some form of test equipment is mandatory.

At the top of every installer's "wish list" is a spectrum analyser. There is no better way of initially locating satellites, peaking dish alignment and feed adjustments or locating line and equipment faults.

The Promax MC-944 is a multipurpose machine that includes spectrum analyser capabilities. It also:

- ▶ Functions as a battery operated (at dish) power supply for an LNB
- ▶ Functions as a satellite TV receiver with a black and white display of the received image along with fully adjustable sub-carrier sound
- ▶ Tells you the precise frequency of any carrier you are tuned to, as well as the dBuV signal level of the carrier
- ▶ Relates the operating voltage (13, 15, 18) to any LNB that may be connected, and also advises you of the



current drain (amount of power being used; a check on LNB performance).

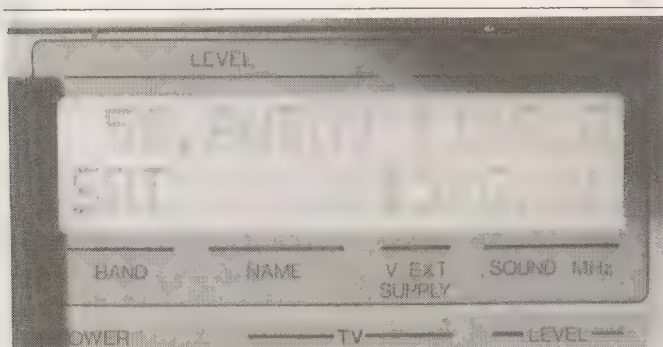
The MC-944 is equipped with a rechargeable lead acid battery (typical recharge time 7 hours) that will, under normal use, power the instrument for 60-80 minutes time; a battery voltage status display is on the multi-function keyboard. With the AC cord, standard mains operation functions over a range of 90-250vac, 50-60 hertz. The unit weighs 11.5 kg, has a protective carrying bag and is almost identical in physical size to the Avcom (of Virginia) PS-37D competition.

Frequency coverage is 48-860 MHz (with appropriate terrestrial TV software presets to allow use of all functions including masthead amplifier powering) and 950-2050 MHz (with appropriate software presets for reception of frequency modulated TV signals using subcarrier audio sound).

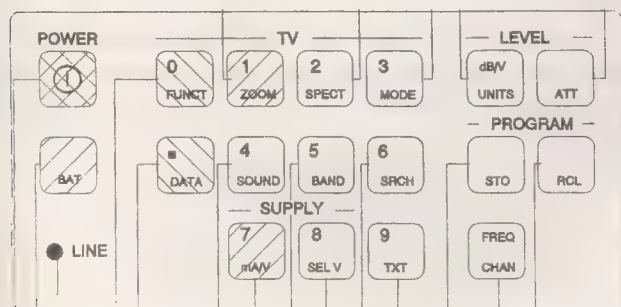
Operation

As a battery operated portable satellite TV receiver and (5.5" B & W) display system, for use at the dish site, the MC-944 does everything you could ask, reliably. There are thoughtful software routines included, such as the unit shuts down 15 minutes after you last touch an operating "key"; a safeguard against allowing the battery to run down if left unattended.

The spectrum analyser display is very useful for locating the satellite and peaking the dish. In the analyser mode you see the entire spectrum from the LNB or (your option) a bandwidth as narrow as 0.5 megahertz (500 kHz). A cursor (black marker) appears on the screen and you tune a control to move the cursor across the screen. By "marking" a particular carrier, the MC-944 will then tell you the frequency of the (marked)



Accurate readout of incoming frequency (satellite IF) and signal level (top line of LCD) is a plus feature



SOME SEATING STILL AVAILABLE

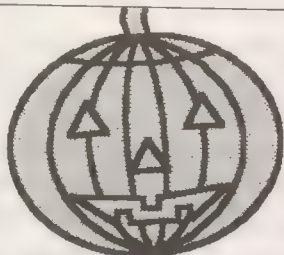


South Pacific Region Satellite & Cable Show
January 23-27, 1996
at University of Auckland
Tamaki Campus.

SOME DAY - All trade shows will be run like this.

21 page information packet from **SPACE Pacific**,
PO Box 30, Mangonui, Northland, NZ
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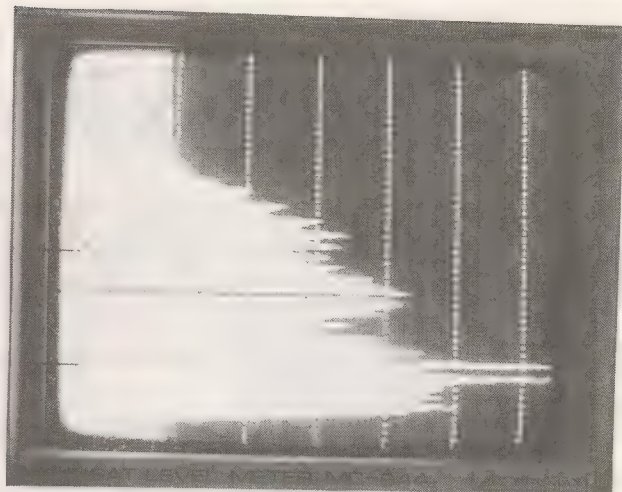
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- ◆ **SPACE** individual (home DTH) members: US\$50 per year in NZ, 3 year minimum outside of NZ. Commercial rates for motels, SMATV, cable upon request.

NOTE: Requires SA D9222 IRD with dish typically 2.4 to 3m. IRDs available through **SPACE Dealer Members** & Telsat Communications.

SPACE PACIFIC PROGRAMMING: Ph. 64-9-406-1282
Fax: 64-9-406-1083 • POB 30, Mangonui, Northland, NZ

SatFACTS September 1995 ♦ page 26



Spectrum analyser image is "sideways" on screen with base (no signal) at left edge. Just below centre, horizontal black line is "cursor" which user tunes to identify parameters of specific carriers.

carrier and its strength (in dBuV). This feature alone is nearly worth the price of admission and you can touch buttons and switch from the spectrum display to a cursor marked display with frequency and level readout and then to the actual TV picture on the display screen and sound from the built-in speaker.

Storage and Recall

Learning to operate the instrument requires some hands on, quiet time. Virtually everything you need can be entered into one of 99 instant-recall memories. Terrestrial and satellite services can be memory channel mixed. The MC-944 is intended to be a world standard TV reception testing tool and it will jump back and forth between channel and powering standards with ease. By limiting its own display to black and white, the issue of NTSC versus Pal versus Secam is avoided. External equipment can be connected to video, IF and satellite baseband (for decoder connection) ports provided. There are also Euroconnector and RS232C ports.

Synopsis

While there certainly are better spectrum analysers available, for slightly less money, no other instrument presently on the market does as much, as well, as the MC-944. For the serious DTH and SMATV installer who also dabbles in cable TV, it would be difficult to own a single instrument that allows more professional measurements in all 3 fields, and, adds terrestrial TV as a bonus.

You may not think you can afford one, today. But someday you will and an eight page brochure available (below) will tell you why.

MC-944 Sourcing

Gough Technology, PO Box 22073, Christchurch
Tel 64-3-379-8740, Fax 63-3-379-6776
Gough Technology, PO Box 514, Sydney 2020
Tel 61-2-667-3337, Fax 61-2-667-3131
Pricing Range: Near \$6,000

SatFACTS PACIFIC OCEAN ORBIT WATCH: 15 September 1995

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IF Freq	Gz25/103	G1/130	Gz18/140	G2/142	Gz21/144	P169/Vt	P169/Hz	IF Freq	180/RH	180/LH
1,475	DubITV	RAJ(X2)	DubITV	ATN	DubITV			1,432	Keystn	
1,425	Muslim	SunMovie	Muslim	JJAY				1,388	MPEG	
1406/1425						CMT/CBS	ABN/CTN	1,325	MPEG	
1,375	APNA	ABC-5/d		(CellFone)				1,310	MPEG	
1346/1372						MTV/b	Discov/b	1,277	NBC	
1,325		AsiaNet		EagleNet				1,256	Keyston	
1288/1300						ESPN/b	OccVid	1,223	CBS	
1,275		(vacant)		EMTV	Moscow 2			1,179	WNet	
1235/1249						P2/Sylmar	AsiaFeeds	1,137	NHK	
1,225		SunMusic		Udaya				1,105	RFO	1092/data
1161/1183						Prime/d	CNN (X2)	1,054	(data)	Canal +/d.
1110/1115							NHK	1,021	Aust 9	Aust.9
1038/1060						ANBC	Fi.Ch/d	988	NZ/dig.	
998/985						TNT/Car/b	(data)	980	NZ/dig.	
								972	NZ/dig.	
								964	NZ/dig.	

September 1995 NOTES

- ▶ /b is B-MAC (NTSC or PAL depending upon service)
- ▶ /d or /dig. is some form of digital (MPEG)
- ▶ Intelsat 1180 includes right and left hand circular transmissions (separate)
- ▶ VDP indicates vidiplexed transmission(s); 2 video on same transponder requiring Vidiplex decoder for separation (available in marketplace)
- ▶ (X2) indicates 1/2 transponder format with typically two programmes present
- ▶ Ku IF's for A3 and B1 satellites (below) are for standard LNB LO of 11,300

ANBC indicates reception on 3m or smaller antenna

TNT/Car underline indicates subscriptions may be available/SF#10, p.18

I177E/I174E
IFs of 984 & 963 carry many international news feeds in right hand circular; on I177E, IF of 973 carries AFRTS in B-MAC, left hand circular with AFRTS radio subcarrier. Both birds also loaded with narrowband carriers.

Ku BAND ACTIVITY UPDATE

A3/B1TR	IF Freq	B3: 155.9E	B1: 160.0E	Satellite	RF Freq	Coverage Beam	Service Report
1(V)	977		Tab radio; data	PAS-2	12,334	NE Asia	None since August
5L(V)	1,193	ETV>0000UTC	Occ. Video, news	PAS-2	12,700	NE Asia	PAS-2 Sylmar
5U(V)	1,218.8		Occ. Video	177W	10,980V	Japan, Asia	US Net feeds
7L(V)	1,344	TVO>1200UTC	ABC Nation./b	177W	11,015V	Japan, Asia	NBC News
7U(V)	1,370		SBS Nation./b	177W	11,510V	Japan, Asia	CNNI
10(H)	1,075.75		Galaxy G1 Digital	180E	11,480H	Japan, Asia	CBS
11(H)	1,138.5	Galaxy NTL Digi.	Galaxy G1 Digital	180E	11,510H	Japan, Asia	(US) ABC
				145E	11,525H	Asia	Sakha TV
				130E	11,525H	Taiwan, China	(Cable pgming)
				96.5E	11,525H	Asia	Active ??

Activation of Optus B3 (August 10) in place of A3 began a process of extensive B1 / B3 transponder shuffling. The most significant area to observe will be the apparent signal level found on B3, horizontal, 1140 MHz (IF) which is the new home for Galaxy digital DTH. Tests currently underway suggest signal levels are below those hoped for; if they do not get better Galaxy faces possible problems attaining the coverage they intended for 60cm dishes in

eastern coastal Australia.

-SatFACTS DATA SHOPPE-

YOUR Source For Reference, Study Materials In The World Of Satellite TV

ENTRY LEVEL:

☐ **SATELLITE TELEVISION: All You Need To Know.** Brand new 28 page booklet with four-colour cover designed to help you educate potential customers about the joys of owning a home dish system. Sold through SPACE Dealer Members at \$10 to individuals. Single copies available via fast post within NZ (NZ\$10) or elsewhere (US\$10) using order form on page 29 here.

☐ **TB9402 / MATV: Master Antenna Television Systems.** How to plan, select equipment for and install multiple outlet systems for motels, hotels, apartment flats and condos. Practical step by step guidance. Price: NZ\$20 world-wide.

☐ **TB9404 / Home Satellite Systems.** What the parts are, how they go together for POR home TVRO systems; how you create a working system with maximum performance at minimum outlay. Price: NZ\$20 world-wide.

☐ **TB9405 / Commercial Satellite Dish Systems (SMATV).** If you are building a system from scratch, also order TB9402 for the MATV portion basics. If you are rebuilding an existing MATV system to add satellite signals, you need this! Price: NZ\$20 world-wide.

■ **ALL 3 (TB9402, 9404, 9405) as a package for NZ\$40 (you save \$20).**

DISH OWNING ENTHUSIAST LEVEL:

☐ **Coop's Satellite Operations Manual.** Originally written 1980, this manual explains how you locate and interpret the multitude of wide and narrow band signals available via satellite. Dozens of fun, new ways to get more from your dish system. Price: \$NZ30 world-wide.

☐ **Gibson Satellite Navigator (O/w 1980).** The mechanics of the Clarke Orbit Belt, how a dish tracking system is designed and operated to allow full horizon to horizon reception with a motorised dish system. Very practical, very hands on with plenty of do-it-yourself instruction for inexpensive systems. Price: NZ\$30 world-wide.

☐ **Coop's Basic Manual on Fine Tuning Satellite Terminals (O/w 1980).** The little things such as feeds, connectors, powering. Tips from the people who started home dish reception in the 1970s, building the foundation for the present TVRO industry day by day, discovery by discovery. Very practical, very hands on. Price: \$NZ30 world-wide.

■ **ALL 3 (Two from Coop, one Gibson) as a package for NZ\$70 (you save \$20).**

BUSINESS MANAGEMENT REFERENCE MATERIAL:

☐ **CTD 9412 / StarNET TV Wants To Put You In The Cable TV Business.** When AsiaSat 2 is launched this year, StarNET's 7 free to air (plus 35 pay TV) services are designed to make you a cable TV operator. Price: \$NZ30 world-wide.

☐ **CTD 9503 / COPYRIGHT - How It Works, Your Liabilities.** Must reading for anyone planning to distribute satellite programming to motels, hotels, communities. Price: NZ\$30 world-wide.

☐ **CTD 9504/ GALAXY** - The detailed, inside story of what it is, where it wants to go. If you are hoping for Ku-band DTH in Australia and New Zealand, Galaxy is the most promising programme provider. Price: NZ\$30 world-wide.

SatFACTS September 1995 POR OBSERVER REPORTING FORM

(Please FAX [64-9-406-1083] or mail to arrive by 02 October)

TELL US what you are seeing, or using for equipment, that is new within the last 30 days. Observer reports (see "With The Observers" page 22) form an important part of the growing body of information we all share monthly.

• NEW programming sources seen since 1 September: (Please list receiver 'TF' or satellite transponder number if known) _____

• CHANGES in reception quality since 1 September: _____

• EQUIPMENT changes at my observing terminal since 1 September: _____

■ My Name _____ Address _____
Town / City _____ Country _____ (Please turn form over)

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SatFACTS DATA SHOPPE ORDER FORM

I wish to order the following reference materials (see description page 28):

- ☐ SATELLITES: All You Need To Know (\$10 inside NZ, US\$10 elsewhere; description p.26)
- ☐ TB9402 / MATV (NZ\$20; SPACE Members \$15).
- ☐ TB9404 / Home Satellite (NZ\$20; SPACE Members \$15).
- ☐ TB9405 / Commercial Satellite (NZ\$20; SPACE \$15).
- ☐ ALL THREE / TB9402, 9404, 9405 (NZ\$40; SPACE \$30)
- ☐ Coop's Satellite Operations (NZ\$30; SPACE \$20).
- ☐ Gibson Navigator (NZ\$30; SPACE \$20).
- ☐ Coop's Basic - Fine Tuning (NZ\$30; SPACE \$20).
- ☐ ALL THREE / OPERATIONS, NAVIGATOR, BASIC (NZ\$70; SPACE Members \$50).
- ☐ CTD 9412 / StarNET Wants To Put You in Cable TV (NZ\$30; SPACE Members \$20)
- ☐ CTD 9503 / Copyright As It Applies to Satellite Reception (NZ\$30; SPACE Members \$20)
- ☐ CTD 9504 / GALAXY: The Inside Story (NZ\$30; SPACE Members \$20)

Instructions:

- ☒ Check off items you wish airmailed to you
- Make cheque to Far North Cablevision Ltd.
- Complete reverse side of card

■ YOUR equipment survey:

Size dish(es): _____; Noise Temp LNB(s): _____

Make/model receiver(s): _____

Make/model standards conversion: _____

■ JCSAT-3 Observer Survey:

C and Ku band JCSAT-3 should begin testing from 128E towards the end of this reporting period. C band transponders are located between 3930 and 4200 MHz (IF 950-1220); Ku between 12,250 and 12,750 (IF 950-1450). Please indicate transponders seen, relative strength, date first seen (see SF#12, p. 6):

If mailing, to: SatFACTS Observers, PO Box 330, Mangonui, Far North, New Zealand

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You select the one that best suits you) have first choice of exhibit hall spaces at SPRSCS and all members participate in research and development projects to the benefit of the industry. To receive a no-obligation 'Invitation To Join **SPACE Pacific**', complete and return this card.

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Total amount of order (add items ordered on reverse side of this card): NZ\$ _____
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